Environmental Operations, Inc.
CLEARING THE WAY

March 27, 2018

Mr. Bruce Morrison
Project Manager
U.S. Environmental Protection Agency, Region 7
ART Division / RCRA Corrective Action
11201 Renner Boulevard
Lenexa, Kansas 66219

RE: Revised Vapor Intrusion Report
Former Solutia – John F. Queeny Plant
St. Louis, Missouri
EPA ID No. MOD 004 954 111

Dear Mr. Morrison:

This letter accompanies the delivery of the revised *Vapor Intrusion Work Plan Implementation Report* for the Former Solutia John F. Queeny Plant to U.S Environmental Protection Agency (EPA). This revised report reflects comments received from EPA in a letter dated February 27, 2018. An electronic version is also provided.

Please let me know if you would like additional copies. I can be reached by phone at 314-480-4694, or via email at larryr@environmentalops.com.

Respectfully submitted,

Lawrence C. Rosen

RCRA
572149

Lawrence C. Rosen, R.G. / Project Manager
Environmental Operations, Inc.

Attachment: Revised Vapor Intrusion Work Plan Implementation Report – Former Solutia Queeny Plant

Copies: *Mr. Michael House/Solutia*
Mr. Rich Nussbaum/MDNR
Ms. Christine Kump-Mitchell/MDNR

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Environmental Operations, Inc.
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VAPOR INTRUSION
WORK PLAN IMPLEMENTATION REPORT

Former Solutia Queeny Plant

St. Louis, Missouri

March 27, 2018

Prepared for:

SWH Investments II

Prepared by:

Environmental Operations, Inc.

1530 South 2nd Street

St. Louis, Missouri 63104

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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
BGMP	Baseline Groundwater Monitoring Plan
CMS	Corrective Measure Study
COPC	Constituents of Potential Concern
CR	Cancer Risk
EOI	Environmental Operations, Inc.
EPA	Environmental Protection Agency
HI	Hazard Index
HQ	Hazard Quotient
IAC-Risk	Indoor Air Concentration to Risk
IMWP	Interim Measures Work Plan
IUR	Inhalation Unit Risk
MB	Method Blank
MDNR	Missouri Department of Natural Resources
µg/m3	Micrograms per cubic meter
PCE	Tetrachloroethene
PID	Photo-ionization Detector
RCRA	Resource Conservation and Recovery Act
Site	Former Solutia Queeny Plant
TCE	Trichloroethene
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VI	Vapor Intrusion
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

This vapor intrusion investigation was developed through discussions between the U.S. Environmental Protection Agency (EPA) and Environmental Operations, Inc. (EOI), and prepared for SWH Investments II, Missouri.

EOI provided consulting engineering services to SWH Investments II to address obligations under an Administrative Order on Consent (EPA Docket No: RCRA-07-2009-0015), to close the facility, and to prepare the property for redevelopment for industrial/commercial use. This work addressed short-term off-site vapor intrusion concerns.

The approved work plan was developed with the following understanding of prior use, future use, and data generated from prior groundwater sampling events as rationale for proposed sampling and analyses described herein.

- The Site is and has been industrial, and repurposing plans envision light industrial/commercial usage.

- The redevelopment effort, conceptually named Soulard Business Park, has been initiated. As communicated to EPA, the first phase of redevelopment presently includes construction and improvements to the area east of the former FF Building area and north of the former Acetanilides Production Area. Subsequent phases would follow on other portions of the Site.

- Vapor intrusion studies would generate data to evaluate potential existing concerns for vapor generation from the groundwater impacts in downgradient locations to the north of the site.

This work has included two phases of investigation: sub-slab soil gas and indoor air. The sub-slab testing included two structures: the Ahrens office building, and a school bus maintenance building that had an employee break room and dispatch area. Results from the sub-slab testing indicated that no indoor air testing was necessary in the bus maintenance building. These results were transmitted in a report to EPA dated February 9, 2017. This revised report includes data and discussion of the sub-slab phase of work.

Indoor air testing in the Ahrens office building was conducted in January and July 2017, with the results shown in the following table:

January 2017	Chloroform	PCE	TCE
IA-1	< 2.4	17.2	3.7
IA-2	< 2.4	22.7	4.9
July 2017	Chloroform	PCE	TCE
IA-1	< 2.4	5.9	< 2.7
IA-2	< 2.4	5.6	< 2.7

Results in µg/m3

Screening and action levels for PCE and TCE are 47/180 and 3/6 µg/m3, respectively.

These data, in formal laboratory reports, were previously submitted to EPA in progress reports. The data indicated that indoor air concentrations of the constituents of potential concern (COPCs) were present below action levels for both sampling events, and below screening levels for all the COPCs for the most recent round. Consequently, the data do not demonstrate the need for a mitigation system for the investigated building.

Over time, as the vapor intrusion process is dynamic, there is a potential for sub-slab gas concentrations to vary. If a source remains in the subsurface, volatilization, diffusion, and advection processes will continue, resulting in sub-slab gas which varies in VOC content. Consequently, EPA may recommend sites be monitored to track these changes. Alternatively, EPA acknowledges a vapor mitigation system to be an acceptable remedy. A vapor mitigation system protects against exposure, in that the vapor intrusion pathway becomes incomplete. Regardless of future variation in sub-slab gas VOC concentrations, further monitoring is unwarranted because the potential for exposure has been eliminated by the mitigation system.

1 INTRODUCTION

The EPA-approved Interim Measures Work Plan (IMWP) Completion Report detailed the activities conducted at the former Solutia Queeny Plant following the approved IWMP and the Baseline Groundwater Monitor Plan (BGMP). These plans were approved by the EPA, for the purpose of implementing an interim remedial response and to evaluate site-wide groundwater for the former FF Building Area, the former acetanilides production area, and monitor groundwater discharging to the Mississippi River from the former bulk chemical storage area.

The impacted groundwater has been determined to be a medium for contaminant migration, and vapor impacts from the groundwater were evaluated in accordance with the EPA-approved work plan. The Groundwater Monitoring and Vapor Intrusion Work Plan, dated July 5, 2016, described a phased approach for investigating vapor intrusion at two locations at the site, with the results reported here.

2 SITE BACKGROUND

The Former Solutia J.F. Queeny Plant (Queeny Plant or Site) is located between Lesperance and Barton Streets and First and Second Streets in St Louis, Missouri. A single address often provided for the Queeny Plant is 200 Russell Street, St Louis, Missouri. Figure 1 is a general Site Location Map showing the Queeny Plant located in the western portion of the Cahokia, Illinois, U.S. Geological Survey (USGS) topographic quadrangle. Figure 2 is site plan using an aerial overlay to help illustrate present features of the site and the adjacent property.

SWH Investments II legally purchased the Queeny Plant and assumed the environmental obligations for the property effective June 13, 2008. Environmental Operations, Inc. (EOI), in affiliation with SWH Investments II, is assuming the responsibilities for the environmental obligations for the Queeny Plant in order to prepare the property for redevelopment for light industrial and commercial use.

Interim measures for site remediation and the Corrective Measures Study (CMS) have been completed.

3 PURPOSE

A vapor intrusion (VI) concern was identified during a March 11, 2016 meeting with EOI, EPA, and MDNR. The agreed conceptual approach was performing a soil gas study around an office building. In order to scope the components of the work plan, a site visit was performed to evaluate the location. During the site visit with MDNR, a second location was identified: a school bus maintenance building that had an employee break room and dispatch area.

The vapor intrusion investigation was designed to generate data to evaluate potential existing concerns for vapor generation from the groundwater impacts in hydraulically downgradient locations to the north of the site.

4 SUB-SLAB INVESTIGATION PHASE

A vapor intrusion (VI) concern was identified during a March 11, 2016 meeting with EOI, EPA, and MDNR. The agreed conceptual approach was performing a soil gas study around an office building. In order to scope the components of the work plan, a site visit was performed to evaluate the location. During the site visit, a second location was identified: a school bus maintenance building that had an employee break room and dispatch area.

Consistent with the rationale expressed during the meeting, and confirmed in a conference call on April 12, 2016, a soil gas survey on the upgradient perimeter was conceived to be the first step in a phased approach to evaluating at these locations. This was also consistent with guidance from EPA in assessing the vapor intrusion pathway from subsurface vapor sources to indoor air (OSWER Publication 9200.2-154). Subsequently, EPA agreed to move directly to sub-slab vapor sampling as the first step.

4.1 Sub-Slab Sampling

A sub-slab gas study was performed directly beneath the two buildings to determine the extent of VOCs that would be potentially available for vapor intrusion. In addition, the sub-slab vapor testing was augmented from one point per building to two points per building. This initial phase of an iterative process concerning vapor intrusion generated data to evaluate potential existing concerns for vapor generation from the groundwater impacts in downgradient locations to the north of the site. The results indicated no further testing was needed in the bus maintenance building. The data from the Ahrens office building indicated that indoor air testing should proceed per the work plan for that building.

4.1.1 Approach

The vapor intrusion evaluation at the Solutia site is being conducted in phases. The first phase involved evaluating the most recent groundwater data (May 2015) to determine if volatiles present in the closest upgradient groundwater are potentially a threat via the vapor intrusion pathway. To make this determination, the USEPA's Vapor Intrusion Screening Level (VISL) Calculator (USEPA, Nov. 2015) was used to screen for constituents of potential concern (COPCs). Screening was performed by comparing the maximum detected chemical concentration of volatile organic chemicals (VOCs) to levels established in the VISL calculator, for the industrial scenario at the 1E-05 cancer risk target level. Chemicals exceeding their respective screening level are considered to be COPCs and are evaluated further. Note that there are no values in the guidance for cis or trans 1,2-dichloroethene.

The COPCs include the following as approved by EPA: 1,1,1-trichloroethane, 1,2-dichloroethane, acetone, benzene, chlorobenzene, chloroform, cis-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene (PCE), toluene, trichloroethene (TCE), trans-1,2-dichloroethene, vinyl chloride, and xylenes. Due to the proximity of the diesel storage tank used by the school bus company and located immediately upgradient to the bus maintenance facility, naphthalene was added as a COPC at that location to evaluate potential presence of diesel fuel versus detections associated with the historic impacts.

The general Solutia site location is depicted in Figure 2. Figure 3 shows the two buildings identified and described in the work plan for collecting the sub-slab samples. The figure also shows the approximate location of the samples and their designation. These buildings are on property owned by Ahrens Contracting, Inc. (Ahrens). Mr. Ted Ahrens, Jr. was contacted to facilitate access. To minimize any disruptions to regular work activities at the planned locations, at the request of Mr. Ahrens, we agreed to conduct the sub-slab vapor collection on Saturday, September 24, 2016.

4.1.2 Field Work

Collection of sub-slab vapor samples was conducted on September 24, 2016. Ms. Christine Kump-Mitchell with MDNR was on-site observing and available for questions or input. Mr. Ahrens and an Ahrens employee, Charlie Evans, provided access to the buildings. The first samples were obtained from the Ahrens office building. Ms. Kump Mitchell agreed that one sample from each end of the east-west trending hallway was best. No known sub-grade utilities were present. The flooring, observed to be in good condition, consisted of 12-inch tile over concrete.

4.1.2.1 Probe and Vapor Pin™ Installation

The first sample location, SSV-1, was collected at the western end of the hallway. A rotary hammer was used to create the requisite hole for placement of sample equipment, a Vapor Pin™. The hole diameter in the floor slab for the pin was approximately 1.5-inches. A 5/8-inch hole was drilled through the slab and a least 1-inch below the slab to create a void. At this location, the floor slab was greater than 10-inches thick. After removal of the bit, the floor surface was cleaned, removing loose cuttings with a vacuum.

The Vapor Pin™ was installed in accordance with the manufacturer's instructions. Care was taken to ensure that a tight seal was made, and the protective cap on the Vapor Pin™ was in place to prevent vapor loss prior to sampling. The sub-slab sample point was flush mounted. Although the Teflon sleeve on the pin should create an adequate seal, a secondary check was performed, utilizing a water dam. Leak testing (shut-in for sampling train) was conducted to ensure a representative sample was collected from the sub-slab vapor probe location.

Collection of SSV-2 was at the eastern end of the hallway. The first three attempts to penetrate the concrete slab were each terminated after drilling nearly three feet into concrete. Upon concurrence with MDNR, the location was moved further east into a room beyond the hallway. The concrete was about 10-inches thick, as seen in the west end of the building, and a sample was collected at this location.

Sample SSV-3 was obtained from the bus maintenance building. The specific location was at the southwest corner of the break room. Sample SSV-4 was also obtained from the bus maintenance building, collected from the northeast end of the break room. The concrete slab for these two locations was about 6.75-inches thick.

4.1.2.2 Sample Collection

At each sample location, the Vapor Pin™ was checked to determine that the pin was not blocked with material that could interfere with air flow. A lab-certified, pre-evacuated, clean 1.0-L Summa® canister was attached to the pin via Teflon tubing. The valve on Summa® canister was then opened. The sub-slab vapor sample was drawn into the canister by pressure equilibration. The sampling time varied by location.

Once this sample, designated SSV-1, was collected, the Summa® valve was closed, and the Teflon tubing was removed. The vapor pin was then removed from the hole. Using Ace® brand, quick-curing, hydraulic cement mixed according to manufacturer's directions, the penetration was sealed. A metal rod was used to tamp the cement mixture so that cement was placed from the base of the hole to the surface. This approach was used on each of the samples/sample locations.

During sampling at sub-slab location SSV-3, it was observed that the flow control valve portion of the sampling apparatus was bent, preventing air flow into the canister. The sampling apparatus was disassembled to remove the bent section and reassembled without the flow control valve or pressure gauge. The lab confirmed sufficient sample was received.

Sample number, sample location, and date collected was recorded on the chain of custody form and on the blank tag attached to the canister. The sample was submitted for analysis using EPA Method TO-15 for those COPCs previously described. This general approach was followed for each of the samples collected. The samples were taken to TekLab for analyses.

4.1.3 Analytical Testing

In accordance with the approved work plan, the samples were analyzed for the COPCs by EPA Method TO-15. The results are attached to this report. Detected COPCs in SSV-1 included 1,1,1-trichloroethane, acetone, chloroform, cis-1,2-dichloroethene, PCE, TCE, and trans-1,2-dichloroethene. Detected COPCs in SSV-2 included 1,1,1-trichloroethane, cis-1,2-dichloroethene, PCE, and TCE. Detected COPCs in SSV-3 included acetone, 1,1,1-

trichloroethane, PCE, and toluene. Detected COPCs in SSV-4 included acetone, benzene, ethylbenzene, PCE, and toluene. Results are presented in Tables 1 through 4.

4.1.3.1 Quality Assurance – Data Validation

Sample Collection and Sample Receipt

Samples were and shipped to Teklab, Inc. on September 24, 2016, as noted in the chain-of-custody (COC) form provided to the laboratory with sample submittal. The applicable data package from Teklab is designated 16091675.

The chain-of-custody was maintained and the canisters were received by Teklab at their analytical facility in good condition. Samples were transferred to the North Bluff Road facility in Collinsville, IL, for analysis.

Upon arrival at the laboratory, pressure readings on the sample canisters were obtained and then compared to the readings taken in the field following sample collection. Each of the comparisons demonstrated less than 5 inches Hg loss from field to lab, with the exception of sample SSV-3. There was an equipment malfunction regarding the canister's in-line gauge as noted previously. Although it was not possible to obtain the final field pressure reading for SSV-3, the sample collection is considered to have been complete, similar to the other three samples collected, as confirmed by the laboratory sample receipt form. Because of this, and the fact that the other three sample canisters did not show a loss of pressure greater than 5 inches Hg from field to lab, all samples are deemed to have arrived at the laboratory in an acceptable manner.

Analytical Methods

Air samples were analyzed by method TO15, providing results for the following VOC analytes by Gas Chromatograph/Mass Spectrometry (GC/MS):

- 1,1,1-trichloroethane
- 1,2-dichloroethane
- acetone
- benzene
- chlorobenzene
- chloroform
- cis-1,2-dichloroethene
- ethylbenzene
- methylene chloride
- naphthalene
- tetrachloroethene
- toluene
- trans-1,2-dichloroethene
- trichloroethene
- vinyl chloride
- xylenes, total

Analytical Reporting Limits

Reporting limits for all data packages were within project requirements. However, due to high concentrations of some target analytes and/or matrix interference, analyses of some analytes required dilutions, as follows.

- All VOCs analyzed in sample SSV-1 required a dilution to a factor of 200, except for tetrachloroethene and trichloroethene, which required dilutions to a factor of 1000.
- All VOCs analyzed in sample SSV-2 required a dilution to a factor of 200, except for trichloroethene, which required a dilution to a factor of 1000.
- All VOCs analyzed in samples SSV-3 and SSV-4 required a dilution to a factor of 2, except for acetone, which required a dilution to a factor of 20.

Laboratory Data Packages

The laboratory analytical data packages were complete, including the Quality Control information. A COC was included with each laboratory data package, double-signed and dated.

Sample Preservation

Sample preservation is not applicable for air samples.

Holding Times

All samples were analyzed by the laboratory within the specified holding. Samples were collected on September 24, 2016 and analyzed on September 28.

Blanks

Two method blank samples were analyzed for this batch of VOCs. Neither resulted in any detections above the method reporting limit.

Laboratory Control Sample

Two laboratory control samples (LCSs) with corresponding laboratory control sample duplicates (LCSDs) were analyzed for this batch. The percent recoveries of compounds spiked/analyzed were all within the percent quality control range limits and the relative percent difference (RPDs) for the duplicates were within the quality control criteria range.

Surrogate Recoveries

Surrogate recoveries for each of the four air samples were within the acceptable criteria range.

On the basis of the data validation described above, all sample data are deemed to be of sufficient quality.

4.1.3.2 Data Evaluation

As described in the work plan, for consistency in screening and evaluating data for an industrial risk scenario, if the sum of the carcinogenic risks exceeds 1E-05, or if the VI hazards sum exceeds 1.0, the next phase, an indoor air study, will be triggered.

USEPA's VISL Calculator (USEPA, May 2016) was used to calculate risk for chemicals analyzed in each gas sample. Detected chemical concentrations were input into the Sub-slab or Exterior Gas Concentration to Indoor Air Concentration (SGC-IAC) model of the VISL. As a conservative measure, the method detection limit (MDL) concentrations of chemicals which were not detected were also input into the VISL SGC-IAC. As indicated above, there are no values in the VISL calculator for cis or trans 1,2-dichloroethene.

Tables 1 through 4 show the COPC concentrations and their respective cancer risk results and noncancer hazard indices (HIs; with the HI being a sum of the individual chemical's hazard quotients [HQs]). Only samples SSV-1 and SSV-2 demonstrated a cumulative cancer risk greater than 1E-05 as well as an exceedance of the noncancer HI criteria of 1.0. The chemicals which demonstrated the major contribution to the cumulative risks in sample SSV-1 are: Chloroform, PCE, and TCE. Each of the risk results for those chemicals demonstrated either a cancer risk greater than 1E-05 and/or an HQ greater than 1.0. For sample SSV-2, the following constituents exceeded at least one of those criteria: PCE, and TCE.

Based upon the data for SSV-3 and SSV-4, criteria were not exceeded, either individually or cumulatively. Supporting documentation of the calculations and evaluation are attached to this report.

Based upon the work conducted and evaluation of the data, as no criteria were exceeded for samples obtained from the bus maintenance building, no additional work is needed per the VI Work Plan for that structure.

Based upon evaluation of the data obtained from the Ahrens office building, as criteria were exceeded, additional work was needed per the VI Work Plan. The next phase of work was collection of indoor air samples. This task was conducted per the Work Plan, with field work coordinated with the building owner.

It should be noted that there is no certain relationship between sub-slab gas concentrations and the potential concentration in the indoor air. Chemical and physical processes will continue, resulting in sub-slab gas concentrations which vary in VOC content. Vapor intrusion into occupied space may not occur, and if it does, the degree is not predictable. Consequently, the indoor air testing phase was appropriate for the Ahrens office building.

5 INDOOR AIR SAMPLING PHASE

5.1 Pre-Sampling Survey

Prior to sampling, a detailed survey of the building was performed. The pre-sampling inspection was used to identify conditions that may affect or interfere with the proposed testing. The inspection included the type of structure, floor layout, physical conditions, and airflows. A product inventory was made to help identify potential sources of interference.

Owners/occupants were requested to assist in filling out a pre-sampling questionnaire. The questionnaire and inventory survey enabled the sampling investigator to document various information on building construction, the occupants, and potential sources of indoor air contamination. A photo-ionization detector (PID) was also used as a screening tool to identify potential sources for interference. As appropriate, an evaluation of the space usage and behavior of occupants was documented. The survey conducted in the initial January event is included in Appendix A.

5.2 Sample Collection

The indoor air samples were collected in the breathing zone between 3 and 5 feet above floor level in laboratory certified pre-evacuated Summa® canisters for volatile organic compound (VOC) analysis by EPA Method TO-15. Each canister was fitted with a calibrated flow regulator to allow the collection of air samples over an 8-hour sample collection time. Two samples per building were obtained in each of two events. The first sampling event occurred on January 24, and the second on July 19, 2017.

Sample number, sample location, and date collected were recorded on the chain-of-custody form, and on a blank tag attached to the canister. Chain-of-custody forms accompanied the samples to the laboratory. Samples were submitted to Teklab, Inc., and analyzed using EPA Method TO-15 for those COPC detected in the soil gas sampling that exceeded criteria. The COPCs included chloroform, PCE, and TCE. The approximate locations for sample collection for each event are shown in Figure 4. The samples were designated IA-1 and IA-2 for each event, with the same location used each time for consistency.

5.3 Summarized Analytical Results

The results from each of the two indoor air sampling events are summarized in the following table.

January 2017	Chloroform	PCE	TCE
IA-1	< 2.4	17.2	3.7
IA-2	< 2.4	22.7	4.9
July 2017	Chloroform	PCE	TCE
IA-1	< 2.4	5.9	< 2.7
IA-2	< 2.4	5.6	< 2.7

Results in ug/m^3

Screening and action levels for PCE and TCE are 47/180 and 3/6 ug/m^3, respectively.

The formal laboratory reports are presented in Appendix B.

5.4 Data Validation

- **Sample Collection and Sample Receipt**

Two air samples were collected in January and July of 2017 and shipped to Teklab, Inc., as requested in the chain-of-custody form provided to the laboratory with sample submittal. The data packages from Teklab that are applicable are #17011313 for the January 2017samples and #17071136 for the July 2017 samples.

The chain-of-custody was maintained for Summa® containers from each event, and they were received by Teklab at their analytical facility in good condition. Samples were transferred to the North Bluff Road facility in Collinsville, IL, for analysis.

Upon arrival at the laboratory, pressure readings on the sample canisters were obtained and then compared to the readings taken in the field following sample collection. Each of the comparisons demonstrated less than 5 in. Hg loss from field to lab and are within acceptable parameters.

Pertinent information regarding the analytical results follow.

- **Analytical Methods**

Air samples were analyzed by method TO15. The results for the following relevant volatile organic chemical (VOC) analytes, as determined from the sub-slab survey, were analyzed by Gas Chromatograph/Mass Spectrometry:

Chloroform
Tetrachloroethene
Trichloroethene

- **Analytical Reporting Limits**

Reporting limits for all data packages were within project requirements; no samples required dilution for proper measurement.

- **Laboratory Data Packages**

The laboratory analytical data packages were complete, including the Quality Control information. A chain-of-custody was included with each laboratory data package, double-signed and dated.

- **Sample Preservation**

Sample preservation is not applicable for air samples.

- **Holding Times**

All samples were analyzed by the laboratory within the specified holding time of 30 days for canisters. The January samples were analyzed within 2 days and the July samples were analyzed within 12 days of collection.

- **Blanks**

Method blanks (MBs) were analyzed in each batch of samples. None of the MBs resulted in any detections above the analytes' respective method reporting limits.

- **Laboratory Control Sample**

Laboratory control samples with corresponding laboratory control sample duplicates were analyzed for each batch of samples. The percent recoveries of compounds spiked/analyzed were all within the percent quality control range limits and the relative percent difference for the duplicates were within the quality control criteria range.

- **Surrogate Recoveries**

Surrogate recoveries for each of the four air samples were within the acceptable criteria range.

All sample analytical data are deemed to be of sufficient quality for decision-making purposes.

6 CONCLUSIONS AND RECOMMENDATIONS

This report documents the tasks performed and data collected to evaluate conditions at the site relevant to the vapor intrusion pathway. Work was performed at this site in a manner consistent with EPA's preferred approach to evaluate multiple lines of evidence for improved risk management decisions (USEPA, 2015).

EPA prefers a multiple lines of evidence approach for primarily the following reasons (USEPA, 2015):

- An approach to evaluate multiple lines of evidence will support a "no further action" decision by reducing the chance of obtaining a false-negative conclusion that no unacceptable risks exist for the VI pathway, when it actually does show an unacceptable risk.
- An approach to evaluate multiple lines of evidence can also reduce the chance of reaching a false-positive conclusion that unacceptable risks exist for the VI pathway, when it actually shows that risks are not unacceptable.

To evaluate multiple-lines of evidence for this site, the process began with previous investigations that included groundwater sampling and analyses for VOCs. Results revealed that VOCs were present in groundwater that may potentially be available for volatilization into the soil gas phase. The next line of evidence evaluated occurred from the conduct of a sub-slab soil gas survey of the office building and the school bus maintenance building. Sub-slab gas analytical data from the bus maintenance building demonstrated that further testing (further lines of evidence) was not warranted. However, the sub-slab gas analytical data collected from the Ahrens office building area indicated that further testing was warranted.

When VOCs are found to be present in the sub-slab soil gas, there may be opportunity for those VOCs to migrate upwards and into the building if sufficient adventitious openings exist in the building's foundation to allow entry. These openings may include "cracks, seams, interstices, and gaps in basement floors, walls, or foundations or through intentional openings, such as perforations due to utility conduits and sump pits" (USEPA, 2015). In the event this occurs, VOCs may collect inside buildings, and if deleterious concentrations exist, individuals working in the building may become exposed, resulting in an increased risk for adverse health effects.

To determine if an unacceptable level of risk exists in the Ahrens office building, the final line of evidence evaluated included the collection and analysis of indoor air samples. EPA's Vapor Intrusion Screening Level (VISL) Calculator (USEPA, 2017) was used to calculate risk for chemicals analyzed in each air sample. Detected chemical concentrations (as shown on the summary table in Section 5.1) were entered into the Indoor Air Concentration to Risk (IAC-Risk) Calculator portion of the VISL, using the commercial exposure setting.

The table below shows the detected chemicals in the indoor air samples and their respective cancer risk results and noncancer hazard indices (HIs; with the HI being a sum of the individual chemical's hazard quotients [HQs]). For the air samples collected in January 2017, the IA-1

sample showed a cumulative cancer risk (CR) of 9.3E-06, which is less than the level of concern of 1E-05, and a noncancer HI of 2.2, which is greater than the noncancer level of concern of 1.0. Approximately 80% of the noncancer HI is contributed by TCE, with an HQ of 1.8. Sample IA-2 collected in January shows a cumulative CR of 1.2E-05, just slightly over the level of concern of 1E-05, and an HQ of 2.8, which is greater than the noncancer level of concern of 1.0. As was shown in sample IA-1, approximately 80% of the cumulative risk of IA-2 is contributed by TCE.

Indoor Air Risk Estimates[1]
Industrial/Commercial Exposure Scenario
Solutia

Sample Date: January 24

	IA-1		IA-2	
Chemical	**Cancer Risk**	**Hazard Quotient**	**Cancer Risk**	**Hazard Quotient**
Tetrachloroethene	1.6E-06	0.4	2.1E-06	0.54
Trichloroethene	7.7E-06	**1.8**	1.0E-05	**2.3**
Cumulative Risk	9.3E-06	**2.2**	**1.2E-05**	**2.8**

Sample Date: July 18

	IA-1		IA-2	
Chemical	**Cancer Risk**	**Hazard Quotient**	**Cancer Risk**	**Hazard Quotient**
Tetrachloroethene	5.5E-07	0.14	5.2E-07	0.13

[1]Per the US Environmental Protection Agency's Vapor Intrusion Screening Level Calculator, June 2017.

Bold indicates risk results greater than 1E-05 for cancer effects and 1.0 for noncancer effects (hazards).

For the air samples collected in July 2017, only PCE was detected in each sample. The CRs for IA-1 and IA-2 are 5.5E-07 and 5.2E-07, respectively, both much lower than the level of concern of 1E-05. The HQs for IA-1 and IA-2 are 0.14 and 0.13, respectively, both much lower than the level of noncancer concern of 1.0.

In addition to evaluating cumulative risk by using the VISL, it is important to also consider relatively new guidance provided by EPA, wherein an indoor air TCE concentration which may affect the developing fetus is considered. EPA has suggested that an action level of 6.0 $\mu g/m^3$ be adopted for an 8-hour duration exposure for the industrial/ commercial scenario (USEPA Region

7, 2016). As shown in the summarized data table in Section 5.1, no TCE indoor air concentrations were shown to exceed this additional level of concern.

The data indicated that indoor air concentrations of the COPCs were present below action levels for both sampling events, and below screening levels for all the COPCs for the most recent round. Furthermore, the July event indicated that detected concentrations were all below its associated cancer risk, its HQ, and the EPA suggested action level for TCE noted above. Consequently, the data do not demonstrate the need for a mitigation system for the investigated building.

Over time, as the vapor intrusion process is dynamic, there is a potential for sub-slab gas concentrations to vary. If a source remains in the subsurface, volatilization, diffusion, and advection processes will continue, resulting in sub-slab gas which varies in VOC content. Consequently, EPA may recommend sites be monitored to track these changes. Alternatively, EPA acknowledges a vapor mitigation system to be an acceptable remedy. A vapor mitigation system protects against exposure, in that the vapor intrusion pathway becomes incomplete. Regardless of future variation in sub-slab gas VOC concentrations, further monitoring is unwarranted because the potential for exposure has been eliminated by the mitigation system.

7 REFERENCES

US Environmental Protection Agency (USEPA). 2017. *Vapor Intrusion Screening Level Calculator,* Version 3.5. OSWER Vapor Intrusion Assessment. Office of Superfund Remediation and Technology Innovation. Washington, DC. June 2017.

US Environmental Protection Agency (USEPA) Region 7. 2016. *Memorandum: EPA Region 7 Action Levels for Trichloroethylene in Air*. Kansas City, Missouri.

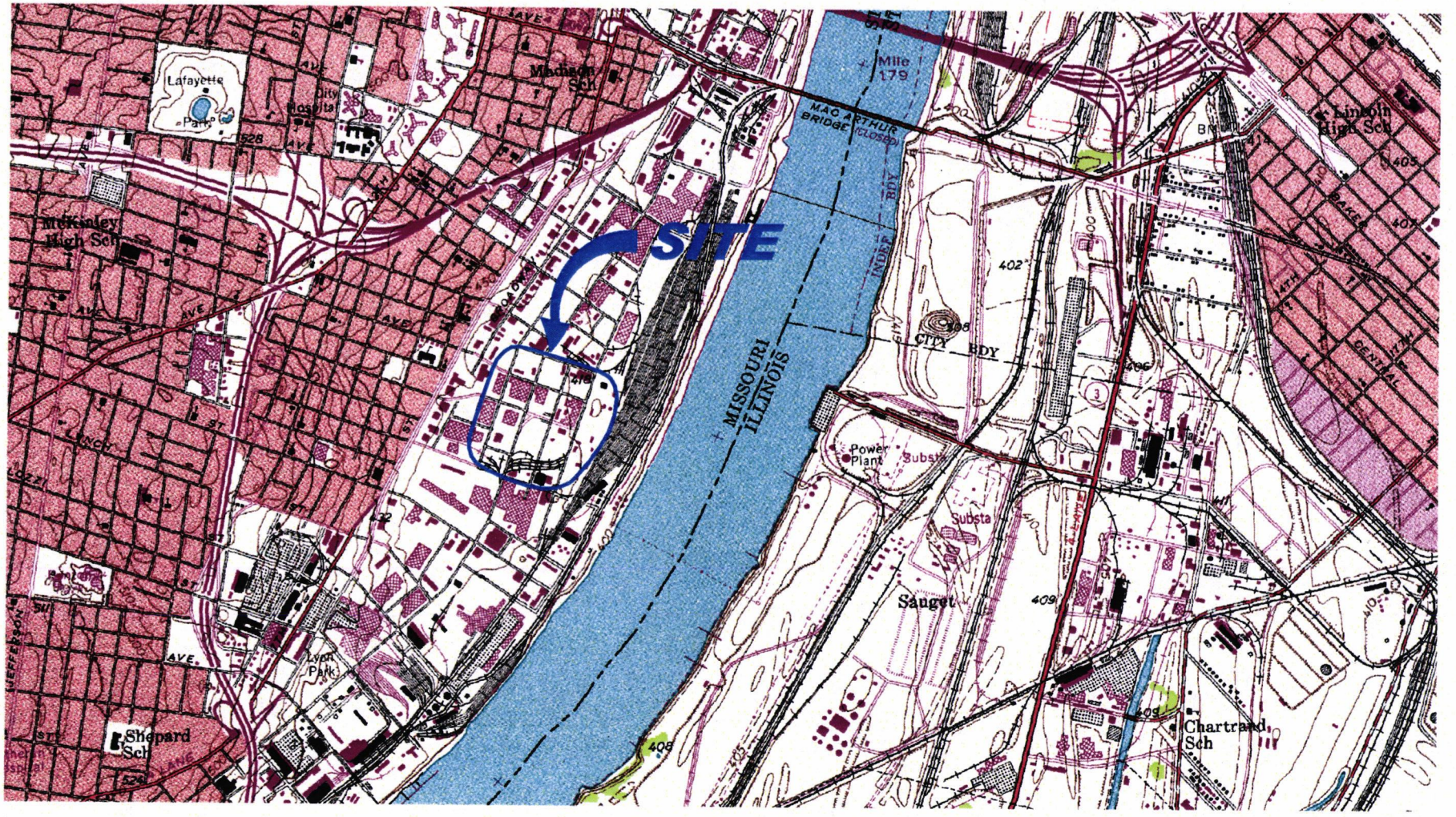
US Environmental Protection Agency (USEPA). 2015. *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air.* OSWER Publication 9200.2-154. Office of Solid Waste and Emergency Response, Washington, DC.

Environmental Operations, Inc.

FIGURES

Project #2950R

Environmental Operations, Inc.



LEGEND

GENERAL LOCATION OF J.F. QUEENY PLANT

BASE MAP REFERENCE: MAP TAKEN FROM ELECTRONIC USGS DIGITAL RASTER GRAPHIC 7.5 MINUTE SERIES TOPOGRAPHIC MAP OF CAHOKIA, ILLINOIS, REVISED 1952.

N

0 2000

SCALE FEET

Site Location Map

Former Solutia Queeny Plant

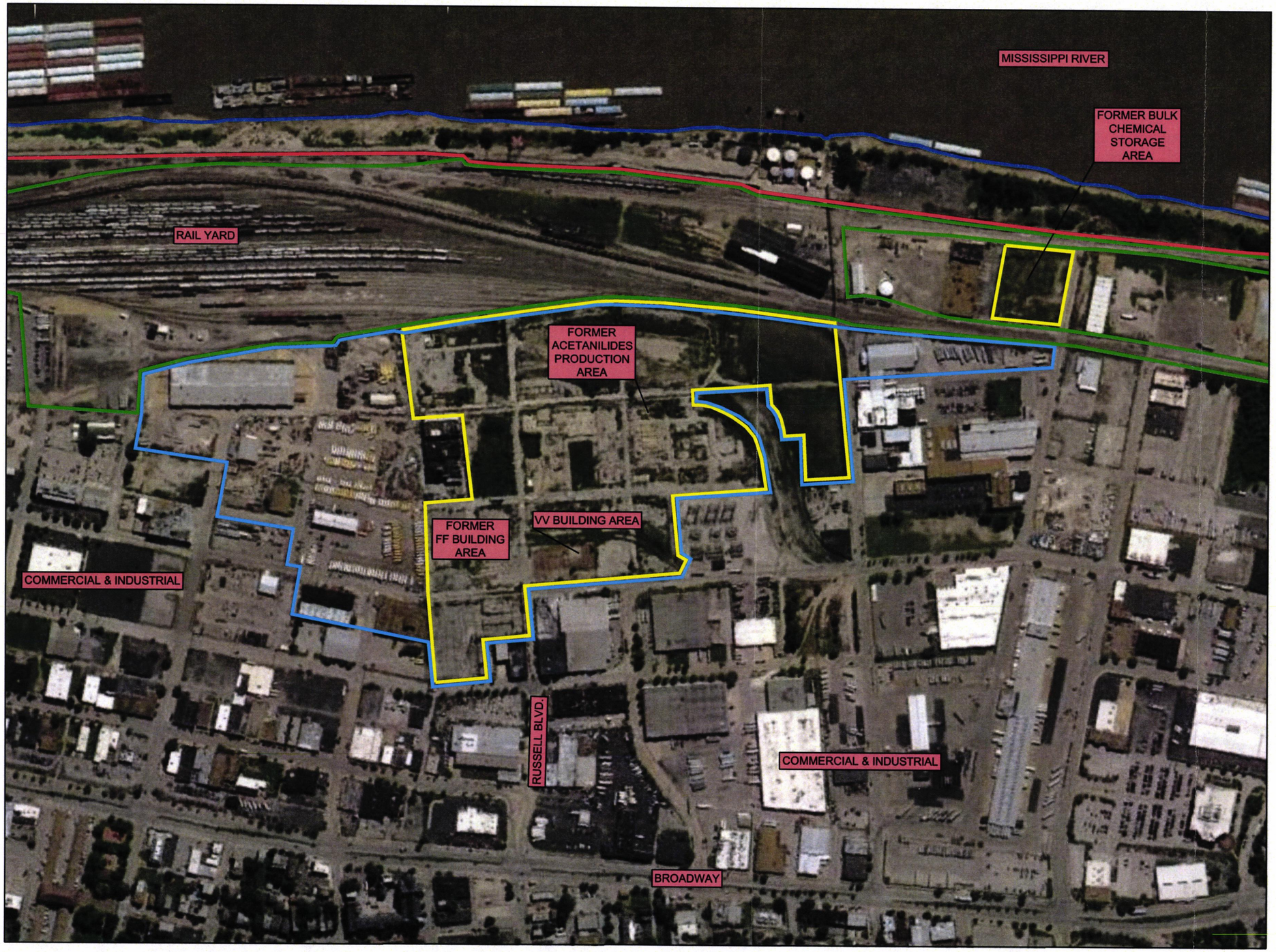
Saint Louis Missouri

Figure 1

M:\3_Eng dwg files\2950 solutia\2950R figures\CMS and VI Study\2950 base cms and vi study.dwg, 4/28/2016 10:54:26 AM, Letter

Project #2950

Environmental Operations, Inc.



North

Not to Scale

0 200 400 800

Approximate Scale, feet

LEGEND

- PERIMETER OF SOLUTIA PROPERTY
- HISTORICAL/MAXIMUM PERIMETER OF SOLUTIA PROPERTY
- PERIMETER OF RAIL YARD & RAILROAD RIGHT-OF-WAY
- EDGE OF THE MISSISSIPPI RIVER
- U.S. ARMY CORPS OF ENGINEERS FLOODWALL

Note:

Illustration based on Google Earth Imagery dated 11.12.2013. This figure should only be used for general illustrative purposes and should not be used for any other purpose beyond the context of the report/letter.

SOLUTIA INC.
RCRA CORRECTIVE MEASURES STUDY (CMS) REPORT
J.F. QUEENY PLANT
ST. LOUIS, MISSOURI

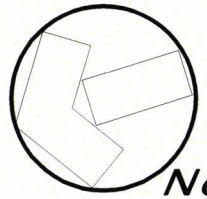
Site Aerial Photograph
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 2

M:\3_Eng dwg files\2950 solutia\2950R figures\CMS and VI Study\Fig 2 Site Aerial Photograph updated.dwg, 4/28/2016 10:58:14 AM, Tabloid

Project #2950R

Environmental Operations, Inc.



0 50 100 200

Approximate Scale, feet

Legend

- Sub-Slab Vapor Sample

Sub-Slab Vapor Sample Locations

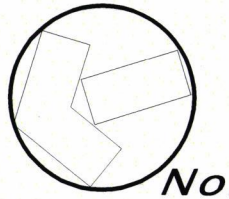
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 3

M:\3_Eng dwg files\2950 solutia\2950R figures\CMS and VI Study\2950 base cms and vi study.dwg, 3/21/2018 12:00:16 PM, Letter

Project #2950R

Environmental Operations, Inc.



0 50 100 200

Approximate Scale, feet

LAFAYETTE AVENUE

IA–1

Ahrens Office Building

IA–2

SOULARD AVENUE

Maintenance Building

SECOND STREET

Legend

- Indoor Air Sample Location (approximate)

Indoor Air Sample Locations

Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 4

M:\3_Eng dwg files\2950 solutia\2950R figures\CMS and VI Study\2950 base cms and vi study.dwg, 3/21/2018 11:58:40 AM, Letter

TABLES

Table 1 SSV-1

Date Collected 9/24/2016 9:26:00 AM

Sample SSV-1 (Nondetects at the Method Detection Level)

Analyte	Unit		Result	Unit		Result	Unit		Result	Qual	Commercial[1] VISL Results CR	HQ
Acetone	ppbv		630	mg/M3		1.4965	ug/m3		1496.5		No IUR	3.30E-04
Benzene	ppbv	<	10	mg/M3	<	0.0319	ug/m3	<	31.9		6.10E-07	7.30E-03
Chlorobenzene	ppbv	<	10	mg/M3	<	0.046	ug/m3	<	46		No IUR	6.30E-03
Chloroform	ppbv		216	mg/M3		1.0546	ug/m3		1054.6		5.90E-05	7.40E-02
1,2-Dichloroethane	ppbv	<	10	mg/M3	<	0.0405	ug/m3	<	40.5		2.60E-06	4.00E-02
Ethylbenzene	ppbv	<	10	mg/M3	<	0.0434	ug/m3	<	43.4		2.70E-07	3.00E-04
Methylene chloride	ppbv	<	10	mg/M3	<	0.0347	ug/m3	<	34.7		8.50E-10	4.00E-04
Naphthalene	ppbv	<	20	mg/M3	<	0.1048	ug/m3	<	104.8		8.70E-06	2.40E-01
Tetrachloroethene	ppbv		8240	mg/M3		55.8882	ug/m3		55888		3.60E-05	9.60E+00
Toluene	ppbv	<	50	mg/M3	<	0.0377	ug/m3	<	37.7		No IUR	5.20E-05
1,1,1-Trichloroethane	ppbv		276	mg/M3		1.5059	ug/m3		1505.9		No IUR	2.10E-03
Trichloroethene	ppbv		10600	mg/M3		56.9618	ug/m3		56962		5.70E-04	2.00E+02
Vinyl chloride	ppbv	<	10	mg/M3	<	0.0256	ug/m3	<	25.6		2.80E-07	1.80E-03
Xylenes, Total	ppbv	<	30	mg/M3	<	0.1303	ug/m3	<	130.3		No IUR	8.90E-03
cis-1,2-Dichloroethene	ppbv		172	mg/M3		0.682	ug/m3		682		No IUR	No RfC
trans-1,2-Dichloroethene	ppbv		108	mg/M3		0.4282	ug/m3		428.2		No IUR	No RfC

ppbv = parts per billion by volume

VISL = vapor intrusion screening level

[1]Results obtained using EPA's Vapor Intrusion Screening Level Calculator, May 2016 Regional Screening Levels (RSLs)

Carcinogenic Risk Sum = 6.8E-04

Noncancer Hazard Index = 2.1E+02

= risk results exceed criteria

Table 2 SSV-2

Date Collected 9/24/2016 9:43:00 AM

Sample SSV-2 (Nondetects at the Method Detection Level)

Analyte	Unit	Result	Unit	Result	Unit	Result	Qual	Commercial[1] VISL Results CR	HQ
Acetone	ppbv	< 40	mg/M3	< 0.095	ug/m3	< 95		No IUR	2.10E-05
Benzene	ppbv	< 10	mg/M3	< 0.0319	ug/m3	< 31.9		6.10E-07	7.30E-03
Chlorobenzene	ppbv	< 10	mg/M3	< 0.046	ug/m3	< 46		No IUR	6.30E-03
Chloroform	ppbv	< 20	mg/M3	< 0.0977	ug/m3	< 97.7		5.50E-06	6.80E-03
1,2-Dichloroethane	ppbv	< 10	mg/M3	< 0.0396	ug/m3	< 39.6		2.50E-06	3.90E-02
Ethylbenzene	ppbv	< 10	mg/M3	< 0.0434	ug/m3	< 43.4		2.70E-07	3.00E-04
Methylene chloride	ppbv	< 10	mg/M3	< 0.0347	ug/m3	< 34.7		8.50E-10	4.00E-04
Naphthalene	ppbv	< 20	mg/M3	< 0.1048	ug/m3	< 104.8		8.70E-06	2.40E-01
Tetrachloroethene	ppbv	7220	mg/M3	48.97	ug/m3	48970		3.10E-05	8.40E+00
Toluene	ppbv	< 10	mg/M3	< 0.0377	ug/m3	< 37.7		No IUR	5.20E-05
1,1,1-Trichloroethane	ppbv	410	mg/M3	2.237	ug/m3	2237		No IUR	3.10E-03
Trichloroethene	ppbv	518	mg/M3	2.7836	ug/m3	2783.6		2.80E-05	9.50E+00
Vinyl chloride	ppbv	< 10	mg/M3	< 0.0256	ug/m3	< 25.6		2.80E-07	1.80E-03
Xylenes, Total	ppbv	< 30	mg/M3	< 0.1303	ug/m3	< 130.3		No IUR	8.90E-03
cis-1,2-Dichloroethene	ppbv	226	mg/M3	0.8961	ug/m3	896.1		No IUR	No RfC
trans-1,2-Dichloroethene	ppbv	< 10	mg/M3	< 0.0396	ug/m3	< 39.6		No IUR	No RfC

ppbv = parts per billion by volume

VISL = vapor intrusion screening level

[1]Results obtained using EPA's Vapor Intrusion Screening Level Calculator, May 2016 Regional Screening Levels (RSLs)

Carcinogenic Risk Sum = 7.7E-05

Noncancer Hazard Index = 1.8E+01

= risk results exceed criteria

Table 3 SSV-3

Date Collected 9/24/2016 11:13:00 AM

Sample SSV-3 (Nondetects at the Method Detection Level)

Analyte	Unit	Result	Unit	Result	Unit	Result	Qual	Commercial[1] VISL Results CR	HQ
Acetone	ppbv	44.4	mg/M3	0.1055	ug/m3	105.5		No IUR	2.30E-05
Benzene	ppbv	< 0.1	mg/M3	< 0.0003	ug/m3	< 0.3		5.70E-09	6.80E-05
Chlorobenzene	ppbv	< 0.1	mg/M3	< 0.0005	ug/m3	< 0.5		No IUR	6.80E-05
Chloroform	ppbv	< 0.2	mg/M3	< 0.001	ug/m3	< 1		5.60E-08	7.00E-05
1,2-Dichloroethane	ppbv	< 0.1	mg/M3	< 0.0004	ug/m3	< 0.4		2.50E-08	3.90E-04
Ethylbenzene	ppbv	< 0.1	mg/M3	< 0.0004	ug/m3	< 0.4		2.40E-09	2.70E-06
Methylene chloride	ppbv	< 0.1	mg/M3	< 0.0003	ug/m3	< 0.3		7.30E-12	3.40E-06
Naphthalene	ppbv	< 0.2	mg/M3	< 0.001	ug/m3	< 1		8.30E-08	2.30E-03
Tetrachloroethene	ppbv	4.38	mg/M3	0.0297	ug/m3	29.7		1.90E-08	5.10E-03
Toluene	ppbv	1.08	mg/M3	0.0041	ug/m3	4.1		No IUR	5.60E-06
1,1,1-Trichloroethane	ppbv	1.12	mg/M3	0.0061	ug/m3	6.1		No IUR	8.40E-06
Trichloroethene	ppbv	< 0.1	mg/M3	< 0.0005	ug/m3	< 0.5		5.00E-09	1.73-03
Vinyl chloride	ppbv	< 0.1	mg/M3	< 0.0003	ug/m3	< 0.3		3.20E-09	2.10E-05
Xylenes, Total	ppbv	< 0.3	mg/M3	< 0.0013	ug/m3	< 1.3		No IUR	8.90E-05
cis-1,2-Dichloroethene	ppbv	< 0.1	mg/M3	< 0.0004	ug/m3	< 0.4		No IUR	No RfC
trans-1,2-Dichloroethene	ppbv	< 0.1	mg/M3	< 0.0004	ug/m3	< 0.4		No IUR	No RfC

ppbv = parts per billion by volume

VISL = vapor intrusion screening level

[1]Results obtained using EPA's Vapor Intrusion Screening Level Calculator, May 2016 Regional Screening Levels (RSLs)

Carcinogenic Risk Sum =	2.0E-07
Noncancer Hazard Index =	8.1E-03

Table 4 SSV-4

Date Collected 9/24/2016 11:07:00 AM

Sample SSV-4 (Nondetects at the Method Detection Level)

Analyte	Unit	Result	Unit	Result	Unit	Result	Qual	Commercial[1] VISL Results CR	Commercial[1] VISL Results HQ
Acetone	ppbv	53	mg/M3	0.1259	ug/m3	125.9		No IUR	2.80E-05
Benzene	ppbv	1.94	mg/M3	0.0062	ug/m3	6.2		1.20E-07	1.40E-03
Chlorobenzene	ppbv	< 0.1	mg/M3	< 0.0005	ug/m3	< 0.5		No IUR	6.80E-05
Chloroform	ppbv	< 0.2	mg/M3	< 0.001	ug/m3	< 1		5.60E-08	7.00E-05
1,2-Dichloroethane	ppbv	< 0.1	mg/M3	< 0.0004	ug/m3	< 0.4		2.50E-08	3.90E-04
Ethylbenzene	ppbv	1.44	mg/M3	0.0063	ug/m3	6.3		3.80E-08	4.30E-05
Methylene chloride	ppbv	< 0.1	mg/M3	< 0.0003	ug/m3	< 0.3		7.30E-12	3.40E-06
Naphthalene	ppbv	< 0.2	mg/M3	< 0.001	ug/m3	< 1		8.30E-08	2.30E-03
Tetrachloroethene	ppbv	4.86	mg/M3	0.033	ug/m3	33		2.10E-08	5.70E-03
Toluene	ppbv	4.56	mg/M3	0.0172	ug/m3	17.2		No IUR	2.40E-05
1,1,1-Trichloroethane	ppbv	< 0.1	mg/M3	< 0.0005	ug/m3	< 0.5		No IUR	6.80E-07
Trichloroethene	ppbv	< 0.1	mg/M3	< 0.0005	ug/m3	< 0.5		5.00E-09	1.70E-03
Vinyl chloride	ppbv	< 0.1	mg/M3	< 0.0003	ug/m3	< 0.3		3.20E-09	2.10E-05
Xylenes, Total	ppbv	< 0.3	mg/M3	< 0.0013	ug/m3	< 1.3		No IUR	8.90E-05
cis-1,2-Dichloroethene	ppbv	< 0.1	mg/M3	< 0.0004	ug/m3	< 0.4		No IUR	No RfC
trans-1,2-Dichloroethene	ppbv	< 0.1	mg/M3	< 0.0004	ug/m3	< 0.4		No IUR	No RfC

ppbv = parts per billion by volume

VISL = vapor intrusion screening level

[1]Results obtained using EPA's Vapor Intrusion Screening Level Calculator, May 2016 Regional Screening Levels (RSLs)

Carcinogenic Risk Sum =	3.5E-07
Noncancer Hazard Index =	1.2E-02

Environmental Operations, Inc.

APPENDIX A

SUB-SLAB ANALYTICAL LABORATORY REPORT

September 30, 2016

Larry Rosen
Environmental Operations, Inc.
1530 South Second Street, Suite 200
St. Louis, MO 63104
TEL: (314) 480-4694
FAX: (314) 436-2900

RE: Solutia 2950R

WorkOrder: 16091675

Dear Larry Rosen:

TEKLAB, INC received 4 samples on 9/25/2016 4:20:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Shelly A Hennessy

Shelly A. Hennessy
Project Manager
(618)344-1004 ex 36
SHennessy@teklabinc.com

Report Contents

Client: Environmental Operations, Inc.

Client Project: Solutia 2950R

Work Order: 16091675

Report Date: 30-Sep-16

This reporting package includes the following:

Client: Environmental Operations, Inc. **Work Order:** 16091675

Client Project: Solutia 2950R **Report Date:** 30-Sep-16

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# - Unknown hydrocarbon	B - Analyte detected in associated Method Blank
E - Value above quantitation range	H - Holding times exceeded
I - Associated internal standard was outside method criteria	M - Manual Integration used to determine area response
ND - Not Detected at the Reporting Limit	R - RPD outside accepted recovery limits
S - Spike Recovery outside recovery limits	T - TIC(Tentatively identified compound)
X - Value exceeds Maximum Contaminant Level	

Client: Environmental Operations, Inc.

Client Project: Solutia 2950R

Work Order: 16091675

Report Date: 30-Sep-16

Cooler Receipt Temp: NA °C

TO15 analysis was performed at the North Bluff Road facility in Collinsville Illinois, Agency Interest No. 166578.

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2017	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2017	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2017	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2017	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2017	Collinsville
Arkansas	ADEQ	88-0966		3/14/2017	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2016	Collinsville
Kentucky	UST	0073		1/31/2017	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Missouri	MDNR	930		1/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2017	Collinsville

Client: Environmental Operations, Inc.
Work Order: 16091675

Client Project: Solutia 2950R
Report Date: 30-Sep-16

Lab ID: 16091675-001
Client Sample ID: SSV-4

Matrix: AIR CANISTER
Collection Date: 09/24/2016 11:07

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
1,1,1-Trichloroethane	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 133.40		0.0005	0.0055		**ND**	mg/m3		
1,2-Dichloroethane	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 98.96		0.0004	0.004		**ND**	mg/m3		
Acetone	NELAP	4	40.0		**53.0**	ppbv	20	09/27/2016 18:53
MW 58.08		0.0095	0.095		**0.1259**	mg/m3		
Benzene	NELAP	0.1	1.00		**1.94**	ppbv	2	09/28/2016 18:38
MW 78.11		0.0003	0.0032		**0.0062**	mg/m3		
Chlorobenzene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 112.56		0.0005	0.0046		**ND**	mg/m3		
Chloroform	NELAP	0.2	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 119.38		0.001	0.0049		**ND**	mg/m3		
cis-1,2-Dichloroethene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 96.94		0.0004	0.004		**ND**	mg/m3		
Ethylbenzene	NELAP	0.1	1.00		**1.44**	ppbv	2	09/28/2016 18:38
MW 106.17		0.0004	0.0043		**0.0063**	mg/m3		
Methylene chloride	NELAP	0.1	2.00		**ND**	ppbv	2	09/28/2016 18:38
MW 84.93		0.0003	0.0069		**ND**	mg/m3		
Naphthalene	NELAP	0.2	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 128.17		0.001	0.0052		**ND**	mg/m3		
Tetrachloroethene	NELAP	0.1	1.00		**4.86**	ppbv	2	09/28/2016 18:38
MW 165.83		0.0007	0.0068		**0.033**	mg/m3		
Toluene	NELAP	0.1	1.00		**4.56**	ppbv	2	09/28/2016 18:38
MW 92.14		0.0004	0.0038		**0.0172**	mg/m3		
trans-1,2-Dichloroethene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 96.94		0.0004	0.004		**ND**	mg/m3		
Trichloroethene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 131.39		0.0005	0.0054		**ND**	mg/m3		
Vinyl chloride	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 18:38
MW 62.50		0.0003	0.0026		**ND**	mg/m3		
Xylenes, Total	NELAP	0.3	3.00		**ND**	ppbv	2	09/28/2016 18:38
MW 106.17		0.0013	0.013		**ND**	mg/m3		
Surr: 4-Bromofluorobenzene		0	41.2-165		**95.1**	%REC	2	09/28/2016 18:38
MW 175.00		0	41.2-165		**95.1**	%REC		

Elevated reporting limit due to high levels of target and/or non-target analytes.

Client: Environmental Operations, Inc.

Client Project: Solutia 2950R

Work Order: 16091675

Report Date: 30-Sep-16

Lab ID: 16091675-002

Client Sample ID: SSV-2

Matrix: AIR CANISTER

Collection Date: 09/24/2016 9:43

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
1,1,1-Trichloroethane	NELAP	10	100		**410**	ppbv	200	09/28/2016 19:27
MW 133.40		0.0546	0.5456		**2.237**	mg/m3		
1,2-Dichloroethane	NELAP	10	100		**ND**	ppbv	200	09/28/2016 19:27
MW 98.96		0.0405	0.4047		**ND**	mg/m3		
Acetone	NELAP	40	400		**ND**	ppbv	200	09/28/2016 19:27
MW 58.08		0.095	0.9502		**ND**	mg/m3		
Benzene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 19:27
MW 78.11		0.0319	0.3195		**ND**	mg/m3		
Chlorobenzene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 19:27
MW 112.56		0.046	0.4604		**ND**	mg/m3		
Chloroform	NELAP	20	100		**ND**	ppbv	200	09/28/2016 19:27
MW 119.38		0.0977	0.4883		**ND**	mg/m3		
cis-1,2-Dichloroethene	NELAP	10	100		**226**	ppbv	200	09/28/2016 19:27
MW 96.94		0.0396	0.3965		**0.8961**	mg/m3		
Ethylbenzene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 19:27
MW 106.17		0.0434	0.4342		**ND**	mg/m3		
Methylene chloride	NELAP	10	200		**ND**	ppbv	200	09/28/2016 19:27
MW 84.93		0.0347	0.6947		**ND**	mg/m3		
Naphthalene	NELAP	20	100		**ND**	ppbv	200	09/28/2016 19:27
MW 128.17		0.1048	0.5242		**ND**	mg/m3		
Tetrachloroethene	NELAP	50	500		**7220**	ppbv	1000	09/29/2016 10:27
MW 165.83		0.3391	3.3913		**48.97**	mg/m3		
Toluene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 19:27
MW 92.14		0.0377	0.3768		**ND**	mg/m3		
trans-1,2-Dichloroethene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 19:27
MW 96.94		0.0396	0.3965		**ND**	mg/m3		
Trichloroethene	NELAP	10	100		**518**	ppbv	200	09/28/2016 19:27
MW 131.39		0.0537	0.5374		**2.7836**	mg/m3		
Vinyl chloride	NELAP	10	100		**ND**	ppbv	200	09/28/2016 19:27
MW 62.50		0.0256	0.2556		**ND**	mg/m3		
Xylenes, Total	NELAP	30	300		**ND**	ppbv	200	09/28/2016 19:27
MW 106.17		0.1303	1.3026		**ND**	mg/m3		
Surr: 4-Bromofluorobenzene		0	41.2-165		**98.9**	%REC	200	09/28/2016 19:27
MW 175.00		0	41.2-165		**98.9**	%REC		

Elevated reporting limit due to high levels of target and/or non-target analytes.

Client: Environmental Operations, Inc.
Work Order: 16091675

Client Project: Solutia 2950R
Report Date: 30-Sep-16

Lab ID: 16091675-003
Client Sample ID: SSV-1

Matrix: AIR CANISTER
Collection Date: 09/24/2016 9:26

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
1,1,1-Trichloroethane	NELAP	10	100		**276**	ppbv	200	09/28/2016 20:16
MW 133.40		0.0546	0.5456		**1.5059**	mg/m3		
1,2-Dichloroethane	NELAP	10	100		**ND**	ppbv	200	09/28/2016 20:16
MW 98.96		0.0405	0.4047		**ND**	mg/m3		
Acetone	NELAP	40	400		**630**	ppbv	200	09/28/2016 20:16
MW 58.08		0.095	0.9502		**1.4965**	mg/m3		
Benzene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 20:16
MW 78.11		0.0319	0.3195		**ND**	mg/m3		
Chlorobenzene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 20:16
MW 112.56		0.046	0.4604		**ND**	mg/m3		
Chloroform	NELAP	20	100		**216**	ppbv	200	09/28/2016 20:16
MW 119.38		0.0977	0.4883		**1.0546**	mg/m3		
cis-1,2-Dichloroethene	NELAP	10	100		**172**	ppbv	200	09/28/2016 20:16
MW 96.94		0.0396	0.3965		**0.682**	mg/m3		
Ethylbenzene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 20:16
MW 106.17		0.0434	0.4342		**ND**	mg/m3		
Methylene chloride	NELAP	10	200		**ND**	ppbv	200	09/28/2016 20:16
MW 84.93		0.0347	0.6947		**ND**	mg/m3		
Naphthalene	NELAP	20	100		**ND**	ppbv	200	09/28/2016 20:16
MW 128.17		0.1048	0.5242		**ND**	mg/m3		
Tetrachloroethene	NELAP	50	500		**8240**	ppbv	1000	09/29/2016 11:12
MW 165.83		0.3391	3.3913		**55.8882**	mg/m3		
Toluene	NELAP	10	100		**ND**	ppbv	200	09/28/2016 20:16
MW 92.14		0.0377	0.3768		**ND**	mg/m3		
trans-1,2-Dichloroethene	NELAP	10	100		**108**	ppbv	200	09/28/2016 20:16
MW 96.94		0.0396	0.3965		**0.4282**	mg/m3		
Trichloroethene	NELAP	50	500		**10600**	ppbv	1000	09/29/2016 11:12
MW 131.39		0.2687	2.6869		**56.9618**	mg/m3		
Vinyl chloride	NELAP	10	100		**ND**	ppbv	200	09/28/2016 20:16
MW 62.50		0.0256	0.2556		**ND**	mg/m3		
Xylenes, Total	NELAP	30	300		**ND**	ppbv	200	09/28/2016 20:16
MW 106.17		0.1303	1.3026		**ND**	mg/m3		
Surr: 4-Bromofluorobenzene		0	41.2-165		**95.8**	%REC	200	09/28/2016 20:16
MW 175.00		0	41.2-165		**95.8**	%REC		

Elevated reporting limit due to high levels of target and/or non-target analytes.

Client: Environmental Operations, Inc.

Client Project: Solutia 2950R

Work Order: 16091675

Report Date: 30-Sep-16

Lab ID: 16091675-004

Client Sample ID: SSV-3

Matrix: AIR CANISTER

Collection Date: 09/24/2016 11:13

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
1,1,1-Trichloroethane	NELAP	0.1	1.00		**1.12**	ppbv	2	09/28/2016 21:04
MW 133.40		0.0005	0.0055		**0.0061**	mg/m3		
1,2-Dichloroethane	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 98.96		0.0004	0.004		**ND**	mg/m3		
Acetone	NELAP	4	40.0		**44.4**	ppbv	20	09/27/2016 21:06
MW 58.08		0.0095	0.095		**0.1055**	mg/m3		
Benzene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 78.11		0.0003	0.0032		**ND**	mg/m3		
Chlorobenzene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 112.56		0.0005	0.0046		**ND**	mg/m3		
Chloroform	NELAP	0.2	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 119.38		0.001	0.0049		**ND**	mg/m3		
cis-1,2-Dichloroethene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 96.94		0.0004	0.004		**ND**	mg/m3		
Ethylbenzene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 106.17		0.0004	0.0043		**ND**	mg/m3		
Methylene chloride	NELAP	0.1	2.00		**ND**	ppbv	2	09/28/2016 21:04
MW 84.93		0.0003	0.0069		**ND**	mg/m3		
Naphthalene	NELAP	0.2	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 128.17		0.001	0.0052		**ND**	mg/m3		
Tetrachloroethene	NELAP	0.1	1.00		**4.38**	ppbv	2	09/28/2016 21:04
MW 165.83		0.0007	0.0068		**0.0297**	mg/m3		
Toluene	NELAP	0.1	1.00		**1.08**	ppbv	2	09/28/2016 21:04
MW 92.14		0.0004	0.0038		**0.0041**	mg/m3		
trans-1,2-Dichloroethene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 96.94		0.0004	0.004		**ND**	mg/m3		
Trichloroethene	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 131.39		0.0005	0.0054		**ND**	mg/m3		
Vinyl chloride	NELAP	0.1	1.00		**ND**	ppbv	2	09/28/2016 21:04
MW 62.50		0.0003	0.0026		**ND**	mg/m3		
Xylenes, Total	NELAP	0.3	3.00		**ND**	ppbv	2	09/28/2016 21:04
MW 106.17		0.0013	0.013		**ND**	mg/m3		
Surr: 4-Bromofluorobenzene		0	41.2-165		**95.6**	%REC	2	09/28/2016 21:04
MW 175.00		0	41.2-165		**95.6**	%REC		

Elevated reporting limit due to high levels of target and/or non-target analytes.

Client: Environmental Operations, Inc.

Work Order: 16091675

Client Project: Solutia 2950R

Report Date: 30-Sep-16

TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS

Batch 122846 **SampType:** MBLK Units **ppbv**

SampID: MBLK-U160927-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
1,1,1-Trichloroethane	0.50		ND						09/27/2016
1,2-Dichloroethane	0.50		ND						09/27/2016
Acetone	2.00		ND						09/27/2016
Benzene	0.50		ND						09/27/2016
Chlorobenzene	0.50		ND						09/27/2016
Chloroform	0.50		ND						09/27/2016
cis-1,2-Dichloroethene	0.50		ND						09/27/2016
Ethylbenzene	0.50		ND						09/27/2016
Methylene chloride	1.00		ND						09/27/2016
Naphthalene	0.50		ND						09/27/2016
Tetrachloroethene	0.50		ND						09/27/2016
Toluene	0.50		ND						09/27/2016
trans-1,2-Dichloroethene	0.50		ND						09/27/2016
Trichloroethene	0.50		ND						09/27/2016
Vinyl chloride	0.50		ND						09/27/2016
Xylenes, Total	1.50		ND						09/27/2016
Surr: 4-Bromofluorobenzene			**9.68**	10.00		96.8	41.2	165	09/27/2016

Batch 122846 **SampType:** LCSD Units **ppbv** RPD Limit **30**

SampID: LCSD-U160927-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
1,1,1-Trichloroethane	0.50		**9.06**	10.10	0	89.7	8.970	1.00	09/27/2016
1,2-Dichloroethane	0.50		**10.4**	10.00	0	103.8	10.32	0.58	09/27/2016
Acetone	2.00		**10.6**	10.90	0	96.8	10.63	0.76	09/27/2016
Benzene	0.50		**9.77**	10.40	0	93.9	9.710	0.62	09/27/2016
Chlorobenzene	0.50		**10.8**	10.60	0	101.6	10.72	0.47	09/27/2016
Chloroform	0.50		**9.91**	10.40	0	95.3	9.920	0.10	09/27/2016
cis-1,2-Dichloroethene	0.50		**9.66**	10.10	0	95.6	9.620	0.41	09/27/2016
Ethylbenzene	0.50		**10.4**	10.60	0	98.4	10.40	0.29	09/27/2016
Methylene chloride	1.00		**9.85**	9.500	0	103.7	9.830	0.20	09/27/2016
Naphthalene	0.50		**14.5**	10.60	0	136.7	13.98	3.58	09/27/2016
Tetrachloroethene	0.50		**10.3**	10.50	0	98.2	10.26	0.49	09/27/2016
Toluene	0.50		**9.92**	10.50	0	94.5	9.880	0.40	09/27/2016
trans-1,2-Dichloroethene	0.50		**10.4**	11.00	0	94.3	10.37	0.00	09/27/2016
Trichloroethene	0.50		**10.3**	10.80	0	95.0	10.22	0.39	09/27/2016
Vinyl chloride	0.50		**10.7**	10.40	0	102.5	10.63	0.28	09/27/2016
Xylenes, Total	1.50		**32.2**	31.30	0	102.8	32.19	0.06	09/27/2016
Surr: 4-Bromofluorobenzene			**10.0**	10.00		100.1			09/27/2016

Client: Environmental Operations, Inc.

Work Order: 16091675

Client Project: Solutia 2950R

Report Date: 30-Sep-16

TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS

Batch 122846 **SampType:** LCS Units **ppbv**

SampID: LCS-U160927-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
1,1,1-Trichloroethane	0.50		**8.97**	10.10	0	88.8	54.7	131	09/27/2016
1,2-Dichloroethane	0.50		**10.3**	10.00	0	103.2	58.1	142	09/27/2016
Acetone	2.00		**10.6**	10.90	0	97.5	67.6	151	09/27/2016
Benzene	0.50		**9.71**	10.40	0	93.4	57.5	137	09/27/2016
Chlorobenzene	0.50		**10.7**	10.60	0	101.1	59.6	155	09/27/2016
Chloroform	0.50		**9.92**	10.40	0	95.4	72.3	136	09/27/2016
cis-1,2-Dichloroethene	0.50		**9.62**	10.10	0	95.2	78	138	09/27/2016
Ethylbenzene	0.50		**10.4**	10.60	0	98.1	58.3	158	09/27/2016
Methylene chloride	1.00		**9.83**	9.500	0	103.5	68.1	130	09/27/2016
Naphthalene	0.50		**14.0**	10.60	0	131.9	0	261	09/27/2016
Tetrachloroethene	0.50		**10.3**	10.50	0	97.7	60.3	148	09/27/2016
Toluene	0.50		**9.88**	10.50	0	94.1	56.9	150	09/27/2016
trans-1,2-Dichloroethene	0.50		**10.4**	10.00	0	103.7	69	134	09/27/2016
Trichloroethene	0.50		**10.2**	10.80	0	94.6	59.2	141	09/27/2016
Vinyl chloride	0.50		**10.6**	10.40	0	102.2	65	125	09/27/2016
Xylenes, Total	1.50		**32.2**	31.30	0	102.8	56	146	09/27/2016
Surr: 4-Bromofluorobenzene			**10.1**	10.00		100.7	41.2	165	09/27/2016

Batch 122887 **SampType:** MBLK Units **ppbv**

SampID: MBLK-U160928-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
1,1,1-Trichloroethane	0.50		**ND**						09/28/2016
1,2-Dichloroethane	0.50		**ND**						09/28/2016
Acetone	2.00		**ND**						09/28/2016
Benzene	0.50		**ND**						09/28/2016
Benzene	0.50		**ND**						09/28/2016
Chlorobenzene	0.50		**ND**						09/28/2016
Chloroform	0.50		**ND**						09/28/2016
cis-1,2-Dichloroethene	0.50		**ND**						09/28/2016
Ethylbenzene	0.50		**ND**						09/28/2016
Ethylbenzene	0.50		**ND**						09/28/2016
Methylene chloride	1.00		**ND**						09/28/2016
Naphthalene	0.50		**ND**						09/28/2016
Tetrachloroethene	0.50		**ND**						09/28/2016
Toluene	0.50		**ND**						09/28/2016
Toluene	0.50		**ND**						09/28/2016
trans-1,2-Dichloroethene	0.50		**ND**						09/28/2016
Trichloroethene	0.50		**ND**						09/28/2016
Vinyl chloride	0.50		**ND**						09/28/2016
Xylenes, Total	1.50		**ND**						09/28/2016
Surr: 4-Bromofluorobenzene			**8.85**	10.00		88.5	41.2	165	09/28/2016
Surr: 4-Bromofluorobenzene			**9.07**	10.00		90.7	41.2	165	09/28/2016

Client: Environmental Operations, Inc.

Client Project: Solutia 2950R

Work Order: 16091675

Report Date: 30-Sep-16

TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS

Batch 122887 **SampType:** LCSD Units **ppbv** RPD Limit **30**

SampID: LCSD-U160928-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
1,1,1-Trichloroethane	0.50		**9.63**	10.10	0	95.3	9.320	3.27	09/28/2016
1,2-Dichloroethane	0.50		**11.1**	10.00	0	111.2	10.96	1.45	09/28/2016
Acetone	2.00		**11.5**	10.90	0	105.5	11.37	1.14	09/28/2016
Benzene	0.50		**8.97**	10.40	0	86.2	8.700	3.06	09/28/2016
Benzene	0.50		**10.5**	10.40	0	100.8	10.17	3.00	09/28/2016
Chlorobenzene	0.50		**11.5**	10.60	0	108.9	11.21	2.90	09/28/2016
Chloroform	0.50		**10.4**	10.40	0	100.3	10.25	1.74	09/28/2016
cis-1,2-Dichloroethene	0.50		**10.2**	10.10	0	100.9	9.960	2.28	09/28/2016
Ethylbenzene	0.50		**11.3**	10.60	0	106.3	10.96	2.79	09/28/2016
Ethylbenzene	0.50		**10.6**	10.60	0	99.8	10.29	2.78	09/28/2016
Methylene chloride	1.00		**10.5**	9.500	0	110.7	10.32	1.92	09/28/2016
Naphthalene	0.50		**16.6**	10.60	0	157.0	15.24	8.78	09/28/2016
Tetrachloroethene	0.50		**10.9**	10.50	0	104.0	10.62	2.79	09/28/2016
Toluene	0.50		**10.6**	10.50	0	100.6	10.28	2.69	09/28/2016
Toluene	0.50		**9.46**	10.50	0	90.1	9.210	2.68	09/28/2016
trans-1,2-Dichloroethene	0.50		**11.0**	11.00	0	99.8	10.81	1.56	09/28/2016
Trichloroethene	0.50		**10.9**	10.80	0	101.1	10.62	2.79	09/28/2016
Vinyl chloride	0.50		**11.5**	10.40	0	110.2	11.24	1.94	09/28/2016
Xylenes, Total	1.50		**34.9**	31.30	0	111.5	34.07	2.41	09/28/2016
Surr: 4-Bromofluorobenzene			**8.81**	10.00		88.1			09/28/2016
Surr: 4-Bromofluorobenzene			**8.60**	10.00		86.0			09/28/2016

Batch 122887 **SampType:** LCS Units **ppbv**

SampID: LCS-U160928-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
1,1,1-Trichloroethane	0.50		**9.32**	10.10	0	92.3	54.7	131	09/28/2016
1,2-Dichloroethane	0.50		**11.0**	10.00	0	109.6	58.1	142	09/28/2016
Acetone	2.00		**11.4**	10.90	0	104.3	67.6	151	09/28/2016
Benzene	0.50		**10.2**	10.40	0	97.8	57.5	137	09/28/2016
Benzene	0.50		**8.70**	10.40	0	83.7	57.5	137	09/28/2016
Chlorobenzene	0.50		**11.2**	10.60	0	105.8	59.6	155	09/28/2016
Chloroform	0.50		**10.2**	10.40	0	98.6	72.3	136	09/28/2016
cis-1,2-Dichloroethene	0.50		**9.96**	10.10	0	98.6	78	138	09/28/2016
Ethylbenzene	0.50		**11.0**	10.60	0	103.4	58.3	158	09/28/2016
Ethylbenzene	0.50		**10.3**	10.60	0	97.1	58.3	158	09/28/2016
Methylene chloride	1.00		**10.3**	9.500	0	108.6	68.1	130	09/28/2016
Naphthalene	0.50		**15.2**	10.60	0	143.8	0	261	09/28/2016
Tetrachloroethene	0.50		**10.6**	10.50	0	101.1	60.3	148	09/28/2016
Toluene	0.50		**10.3**	10.50	0	97.9	56.9	150	09/28/2016
Toluene	0.50		**9.21**	10.50	0	87.7	56.9	150	09/28/2016
trans-1,2-Dichloroethene	0.50		**10.8**	10.00	0	108.1	69	134	09/28/2016
Trichloroethene	0.50		**10.6**	10.80	0	98.3	59.2	141	09/28/2016
Vinyl chloride	0.50		**11.2**	10.40	0	108.1	65	125	09/28/2016
Xylenes, Total	1.50		**34.1**	31.30	0	108.8	56	146	09/28/2016
Surr: 4-Bromofluorobenzene			**8.91**	10.00		89.1	41.2	165	09/28/2016
Surr: 4-Bromofluorobenzene			**9.13**	10.00		91.3	41.2	165	09/28/2016

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Environmental Operations, Inc.

Client Project: Solutia 2950R

Work Order: 16091675

Report Date: 30-Sep-16

Carrier: John Riley

Received By: AMD

Completed by: Amber M. Dilallo
On: 26-Sep-16

Reviewed by: Elizabeth A. Hurley
On: 26-Sep-16

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	NA
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.					
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑		
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑		
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑		
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑		

Any No responses must be detailed below or on the COC.

Samples were transferred to Collinsville Air Lab on 9/27/16 at 9:50AM. EAH 9/27/16

Clients final pressure readings followed by readings taken upon arrival at the laboratory. Controller used not indicated, digital gauge used for lab reading. HLR 9/27/16
SSV-4 -5/-3.08
SSV-2 -5/-3.88
SSV-1 -5.5/-2.73
SSV-3 _/-1.06

TEKLAB, INC.
3920 Pintail Drive Suite A, Springfield, IL 62711 Phone (217) 698-1004 Fax (217) 698-1005
5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

pg 1 of 1 Lab Work Order # 1609116075

AIR SAMPLING FIELD FORM AND CHAIN OF CUSTODY

Client Name: Environmental Operations
Address: 1530 South 2nd Street
Phone:
Email: Larry@environmentalopc.com
Project ID:
Project Manager: Larry Kosen
Sampler: Robert Andrews
PO Number: 2950 R

Results Requested (check one)
X Standard
___ 1-3 Day (100% surcharge)
___ 4-5 Day (50% surcharge)
___ Other (specify below)

Sample Type (check one)
___ Ambient Air
___ Indoor Air
X Indoor Sub-Slab
___ Stack
___ Soil Gas/Vapor
___ Landfill Gas
___ Other (specify)

Lab Use Only: Sample pick up: ✓ Y ___ N, Samples on: ___ Ice/Blue ✓ No Ice, NA Temp. °C
Comments:

Lab Use Only				Sample Start Parameters			Sample Stop Parameters			Requested Analysis (list metals/other below in comments)						
Laboratory ID	Sample Identification	Canister Number	Controller Number	Date	Time	Vacuum (in. Hg)	Date	Time	Vacuum (in. Hg)	TO-15 Lists (circle) Standard / Extended	TO-15 select BTEX MBTE Naphthalene Isopropanol TPH-GRO	TO-13	TO-4	PM10/ TSP	Metals	Other
	~~SSV-1~~	~~1609116075-001~~		~~9-24~~	~~4:09~~		~~9-24~~	~~9:29~~								
	~~SSV-2~~	~~1609116075-002~~		~~9-24~~	~~9~~											
	~~SSV-3~~	~~1609116075-003~~		~~9-24~~												
1609116075-001	SSV-4	0658	—	9-24	10:57	-23	9-24	11:07	-5	X						
002	SSV-2	0863	—	9-24	9:33	-29	9-24	9:43	-5	X						
003	SSV-1	0675	—	9-24	9:09	-31	9-24	9:26	-5.5	X						
004	SSV-3	0674	—	9-24	11:12	-30	9-24	11:13	—	X						

Are these samples known to be involved in litigation? If yes, a level IV data package will be generated and a surcharge will apply. ___ Yes ___ No
Are these samples known to be hazardous? ___ Yes ___ No
Special QC Requirements/Special Instructions/Comments:

Shipping Company and Tracking Number: TEKLAB Courier

Relinquished By	Date/Time	Received By	Date/Time
	9-24 / 11:30		9/24/16 11:30
	9/25/16 16:20		9/26/16 16:20
	9/27/16 950		9/27/16 950

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse, and has the authority to sign on behalf of client.

White Copy - Laboratory Yellow Copy- Sampler

Environmental Operations, Inc.

APPENDIX B

SUB-SLAB FIELD NOTES

Environmental Operations, Inc.

Project No.: 2950R Project Name: Solutia Drawing: ___ of ___

Subject: Sub Slab Sampling By: Robert Andrews Scale: ___"= ___' Date: 9-24-16

		Depth	Water Dam	Time Start	Time Stop
Ahrens front	SSV-1	13 1/4"	Pass	9:04	9:26
Ahrens Break room	SSV-2	10.5"	Pass	9:33	9:43
School Vending	SSV-3	6 3/4"	~~Pass~~	11:12 ~~10:54~~	11:13
School sink	SSV-4	6 3/4"	pass	10:57	11:07

	Vac Before	Vac After
SSV-1	-31"	-5.5"
SSV-2	-29"	-5"
SSV-3	-30"	N/A
SSV-4	-23"	-5"

SSV-3 did not pull a vacuum, & the flow regulator was bent. Removed the regulator and hooked up the sample pot to the regulator w/o the gauge. Was not able to determine how much vaccuum was in the ~~sam~~ canister when we sampled.

4.5 hrs

Environmental Operations, Inc.

APPENDIX C

SUB-SLAB VISL CALCULATION TABLES

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Queeny Site, St. Louis, MO SSV-1 Sub-Slab Sample

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
67-64-1	Acetone	1.5E+03	4.49E+01	No IUR	3.3E-04			3.10E+01	A	
71-43-2	Benzene	3.2E+01	9.57E-01	6.1E-07	7.3E-03	7.80E-06	I	3.00E-02	I	
108-90-7	Chlorobenzene	4.6E+01	1.38E+00	No IUR	6.3E-03			5.00E-02	P	
67-66-3	Chloroform	1.1E+03	3.16E+01	**5.9E-05**	7.4E-02	2.30E-05	I	9.80E-02	A	
107-06-2	Dichloroethane, 1,2-	4.1E+01	1.22E+00	2.6E-06	4.0E-02	2.60E-05	I	7.00E-03	P	
100-41-4	Ethylbenzene	4.3E+01	1.30E+00	2.7E-07	3.0E-04	2.50E-06	CA	1.00E+00	I	
75-09-2	Methylene Chloride	3.5E+01	1.04E+00	8.5E-10	4.0E-04	1.00E-08	I	6.00E-01	I	Mut
91-20-3	Naphthalene	1.0E+02	3.14E+00	8.7E-06	2.4E-01	3.40E-05	CA	3.00E-03	I	
127-18-4	Tetrachloroethylene	5.6E+04	1.68E+03	**3.6E-05**	**9.6E+00**	2.60E-07	I	4.00E-02	I	
108-88-3	Toluene	3.8E+01	1.13E+00	No IUR	5.2E-05			5.00E+00	I	
71-55-6	Trichloroethane, 1,1,1-	1.5E+03	4.52E+01	No IUR	2.1E-03			5.00E+00	I	
79-01-6	Trichloroethylene	5.7E+04	1.71E+03	**5.7E-04**	**2.0E+02**	see note	I	2.00E-03	I	TCE
75-01-4	Vinyl Chloride	2.6E+01	7.68E-01	2.8E-07	1.8E-03	4.40E-06	I	1.00E-01	I	VC
1330-20-7	Xylenes	1.3E+02	3.91E+00	No IUR	8.9E-03			1.00E-01	I	

	Symbol	Value
Trichloroethylene		
Vinyl Chloride		

See the Navigation Guide equation for Cia,c for vinyl chloride.

Symbol	Value

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Queeny Site, St. Louis, MO SSV-2 Sub-Slab Sample

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR $(ug/m^3)^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
67-64-1	Acetone	9.5E+01	2.85E+00	No IUR	2.1E-05			3.10E+01	A	
71-43-2	Benzene	3.2E+01	9.57E-01	6.1E-07	7.3E-03	7.80E-06	I	3.00E-02	I	
108-90-7	Chlorobenzene	4.6E+01	1.38E+00	No IUR	6.3E-03			5.00E-02	P	
67-66-3	Chloroform	9.8E+01	2.93E+00	5.5E-06	6.8E-03	2.30E-05	I	9.80E-02	A	
107-06-2	Dichloroethane, 1,2-	4.0E+01	1.19E+00	2.5E-06	3.9E-02	2.60E-05	I	7.00E-03	P	
100-41-4	Ethylbenzene	4.3E+01	1.30E+00	2.7E-07	3.0E-04	2.50E-06	CA	1.00E+00	I	
75-09-2	Methylene Chloride	3.5E+01	1.04E+00	8.5E-10	4.0E-04	1.00E-08	I	6.00E-01	I	Mut
91-20-3	Naphthalene	1.0E+02	3.14E+00	8.7E-06	2.4E-01	3.40E-05	CA	3.00E-03	I	
127-18-4	Tetrachloroethylene	4.9E+04	1.47E+03	**3.1E-05**	**8.4E+00**	2.60E-07	I	4.00E-02	I	
108-88-3	Toluene	3.8E+01	1.13E+00	No IUR	5.2E-05			5.00E+00	I	
71-55-6	Trichloroethane, 1,1,1-	2.2E+03	6.71E+01	No IUR	3.1E-03			5.00E+00	I	
79-01-6	Trichloroethylene	2.8E+03	8.35E+01	**2.8E-05**	**9.5E+00**	see note	I	2.00E-03	I	TCE
75-01-4	Vinyl Chloride	2.6E+01	7.68E-01	2.8E-07	1.8E-03	4.40E-06	I	1.00E-01	I	VC
1330-20-7	Xylenes	1.3E+02	3.91E+00	No IUR	8.9E-03			1.00E-01	I	
	Trichloroethylene				**Symbol**	**Value**	**Symbol**	**Value**		**Symbol**	**Value**
	Vinyl Chloride										

See the Navigation Guide equation for Cia,c for vinyl chloride.

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Queeny Site, St. Louis, MO SSV-3 Sub-Slab Sample

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
67-64-1	Acetone	1.1E+02	3.17E+00	No IUR	2.3E-05			3.10E+01	A	
71-43-2	Benzene	3.0E-01	9.00E-03	5.7E-09	6.8E-05	7.80E-06	I	3.00E-02	I	
108-90-7	Chlorobenzene	5.0E-01	1.50E-02	No IUR	6.8E-05			5.00E-02	P	
67-66-3	Chloroform	1.0E+00	3.00E-02	5.6E-08	7.0E-05	2.30E-05	I	9.80E-02	A	
107-06-2	Dichloroethane, 1,2-	4.0E-01	1.20E-02	2.5E-08	3.9E-04	2.60E-05	I	7.00E-03	P	
100-41-4	Ethylbenzene	4.0E-01	1.20E-02	2.4E-09	2.7E-06	2.50E-06	CA	1.00E+00	I	
75-09-2	Methylene Chloride	3.0E-01	9.00E-03	7.3E-12	3.4E-06	1.00E-08	I	6.00E-01	I	Mut
91-20-3	Naphthalene	1.0E+00	3.00E-02	8.3E-08	2.3E-03	3.40E-05	CA	3.00E-03	I	
127-18-4	Tetrachloroethylene	3.0E+01	8.91E-01	1.9E-08	5.1E-03	2.60E-07	I	4.00E-02	I	
108-88-3	Toluene	4.1E+00	1.23E-01	No IUR	5.6E-06			5.00E+00	I	
71-55-6	Trichloroethane, 1,1,1-	6.1E+00	1.83E-01	No IUR	8.4E-06			5.00E+00	I	
79-01-6	Trichloroethylene	5.0E-01	1.50E-02	5.0E-09	1.7E-03	see note	I	2.00E-03	I	TCE
75-01-4	Vinyl Chloride	3.0E-01	9.00E-03	3.2E-09	2.1E-05	4.40E-06	I	1.00E-01	I	VC
1330-20-7	Xylenes	1.3E+00	3.90E-02	No IUR	8.9E-05			1.00E-01	I	
	Trichloroethylene				Symbol	Value	Symbol	Value		Symbol	Value
	Vinyl Chloride										

See the Navigation Guide equation for Cia,c for vinyl chloride.

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Queeny Site, St. Louis, MO SSV-4 Sub-Slab Sample

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
67-64-1	Acetone	1.3E+02	3.78E+00	No IUR	2.8E-05			3.10E+01	A	
71-43-2	Benzene	6.2E+00	1.86E-01	1.2E-07	1.4E-03	7.80E-06	I	3.00E-02	I	
108-90-7	Chlorobenzene	5.0E-01	1.50E-02	No IUR	6.8E-05			5.00E-02	P	
67-66-3	Chloroform	1.0E+00	3.00E-02	5.6E-08	7.0E-05	2.30E-05	I	9.80E-02	A	
107-06-2	Dichloroethane, 1,2-	4.0E-01	1.20E-02	2.5E-08	3.9E-04	2.60E-05	I	7.00E-03	P	
100-41-4	Ethylbenzene	6.3E+00	1.89E-01	3.9E-08	4.3E-05	2.50E-06	CA	1.00E+00	I	
75-09-2	Methylene Chloride	3.0E-01	9.00E-03	7.3E-12	3.4E-06	1.00E-08	I	6.00E-01	I	Mut
91-20-3	Naphthalene	1.0E+00	3.00E-02	8.3E-08	2.3E-03	3.40E-05	CA	3.00E-03	I	
127-18-4	Tetrachloroethylene	3.3E+01	9.90E-01	2.1E-08	5.7E-03	2.60E-07	I	4.00E-02	I	
108-88-3	Toluene	1.7E+01	5.16E-01	No IUR	2.4E-05			5.00E+00	I	
71-55-6	Trichloroethane, 1,1,1-	5.0E-01	1.50E-02	No IUR	6.8E-07			5.00E+00	I	
79-01-6	Trichloroethylene	5.0E-01	1.50E-02	5.0E-09	1.7E-03	see note	I	2.00E-03	I	TCE
75-01-4	Vinyl Chloride	3.0E-01	9.00E-03	3.2E-09	2.1E-05	4.40E-06	I	1.00E-01	I	VC
1330-20-7	Xylenes	1.3E+00	3.90E-02	No IUR	8.9E-05			1.00E-01	I	
	Trichloroethylene				**Symbol**	**Value**	**Symbol**	**Value**		**Symbol**	**Value**
	Vinyl Chloride										

See the Navigation Guide equation for Cia,c for vinyl chloride.

Environmental Operations, Inc.

APPENDIX D

PRE-SAMPLING SURVEY

Indoor Air Quality Questionnaire and Building Inventory

(This form must be completed for each residence/location involved in indoor air testing)

Preparer's Name Robert Andrews Date/Time Prepared _____

Preparer's Affiliation Environmental Operators Inc Phone No. 314 241 0900

Purpose of Investigation Pre-Indoor Air Sampling & Inventory

1. OCCUPANT:

Interviewed: Y / N

Last Name: Ahrens First Name: ~~First Name:~~

Address: 140 Lafayette Ave, St Louis Mo

County: USA

Home Phone: _____ Office Phone: 314-631-7799

Number of years occupants/persons at this location 11 Number of occupants/persons and age

10 RANGING 25-61

2. OWNER OR LANDLORD: (Check if same as occupant (___)

Interviewed: Y / N

Last Name: 140 LAFAYETTE LLC First Name: _____

Address: 140 Lafayette Ave, St Louis Mo

County: USA

Home Phone: _____ Office Phone: 314-631-7799

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential School (Commercial/Multi-use)
Industrial Church Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other: _____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) Office

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors 1 Building age _____

Is the building insulated? (Y) / N How air tight? Tight / (Average) / Not Tight

4. AIRFLOW

Use professional judgment or, if determinant, use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. RESIDENTIAL OR INDUSTRIAL CONSTRUCTION CHARACTERISTICS (Circle all that apply)

a. Construction: wood frame concrete stone (brick)

b. Construction Foundation type: crawlspace (slab-on-grade)
other:
(describe)_____

c. Building floor: (concrete) dirt stone other:
(describe):_____

d. Building crawlspace floor: uncovered covered covered with:
_____

e. Concrete slab/floor: (unsealed) sealed sealed with:
_____

h. Building conditions: wet damp (dry)
moldy

i.

j. Sump present? Y /(N)

k. Water in sump? Y (N) not applicable

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

_____

_____

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

(Hot air circulation)	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other

_____

The primary type of fuel used is:

(Natural Gas)	Fuel Oil	Kerosene
~~Electric~~	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: electric

Boiler/furnace located in: Basement (Outdoors) Main Floor
Other_____

Air conditioning: (Central Air) Window units Open Windows None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom
(Almost Never) no basement

Level General Use of Each Floor (e.g., family-room, bedroom, laundry, workshop, storage, warehouse, equipment, etc.)

Basement none
1st Floor office
2nd Floor n/a
3rd Floor n/a
4th Floor n/a

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y /(N)

b. Does the garage have a separate heating unit? Y /(N) NA

c. Are petroleum-powered machines or vehicles stored in the garage
(e.g., lawnmower, ATV, car) Y / (N) NA Please specify_____

d. Has the building ever had a fire? Y / (N) When?_____

e. Is a kerosene or unvented gas space heater present? Y / (N) Where? _____

f. Is there a workshop or hobby/craft area? Y / (N) Where & Type? _____

g. Is there smoking in the building? Y / (N) How frequently?
_____

h. Have cleaning products been used recently? (Y) / N When & Type?
_____ General

i. Have cosmetic products been used recently? Y / (N) When & Type?
_____

j. Has painting/staining been done in the last 6 months? Y / (N) Where & When?
_____

k. Is there new carpet, drapes or other textiles? Y / (N) Where & When?
_____

l. Have air fresheners been used recently? Y / (N) When & Type?
_____

m. Is there a kitchen exhaust fan? Y / (N) If yes, where
vented?_____

n. Is there a bathroom exhaust fan? Y / (N) If yes, where
vented?_____

o. Is there clothes dryer? Y / (N) If yes, is it vented
outside? Y / N

p. Has there been a pesticide application? Y / (N) When &
Type?_____

Are there odors in the building? Y / (N)
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / (N)
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist?

If yes, what types of solvents are used? none

If yes, are their clothes washed at work? Y / (N)

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)	(No)
Yes, use dry-cleaning infrequently (monthly or less)	Unknown
Yes, work at a dry-cleaning service	

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____

Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

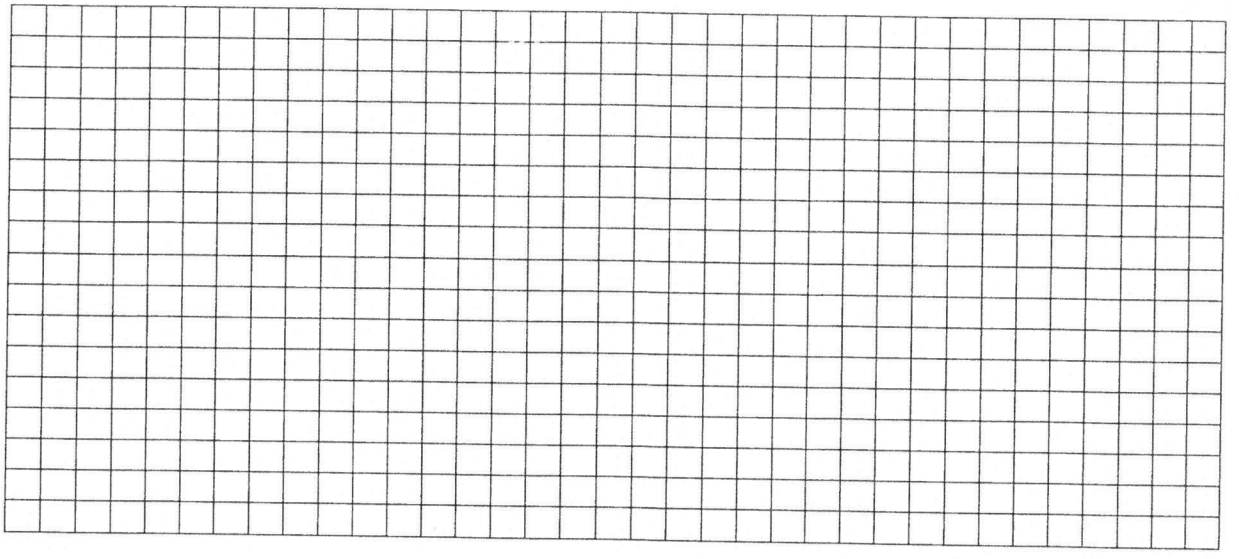
Water Supply: (Public Water) DrilledWell DrivenWell Dug Well Other: _____

Sewage Disposal: (Public Sewer) Septic Tank Leach Field Dry Well Other: _____

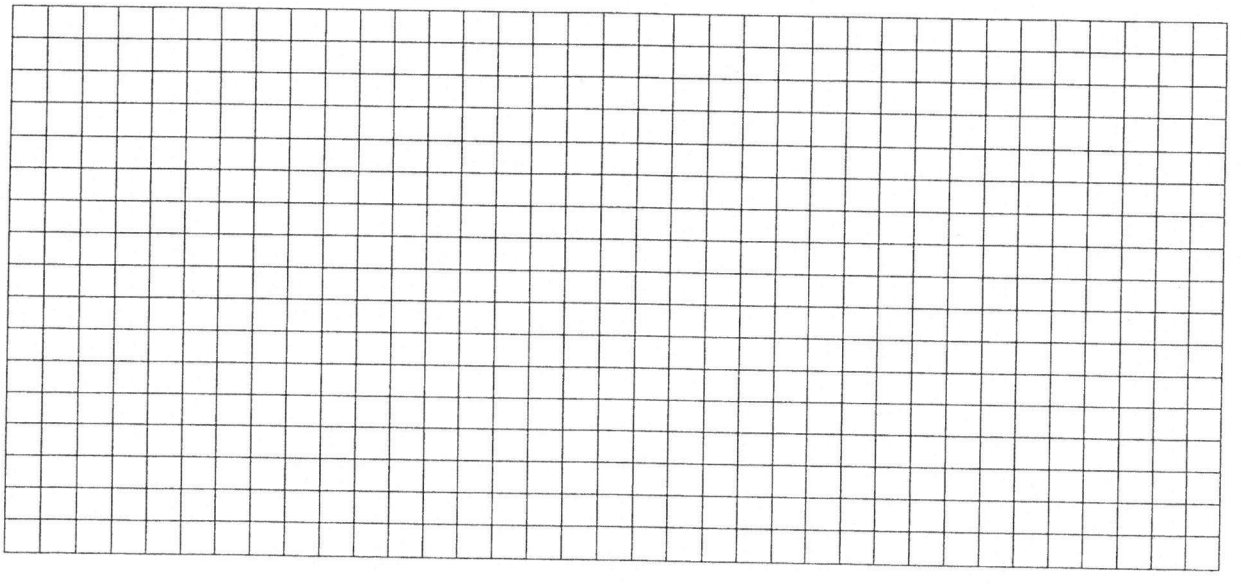
10. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement: no basement



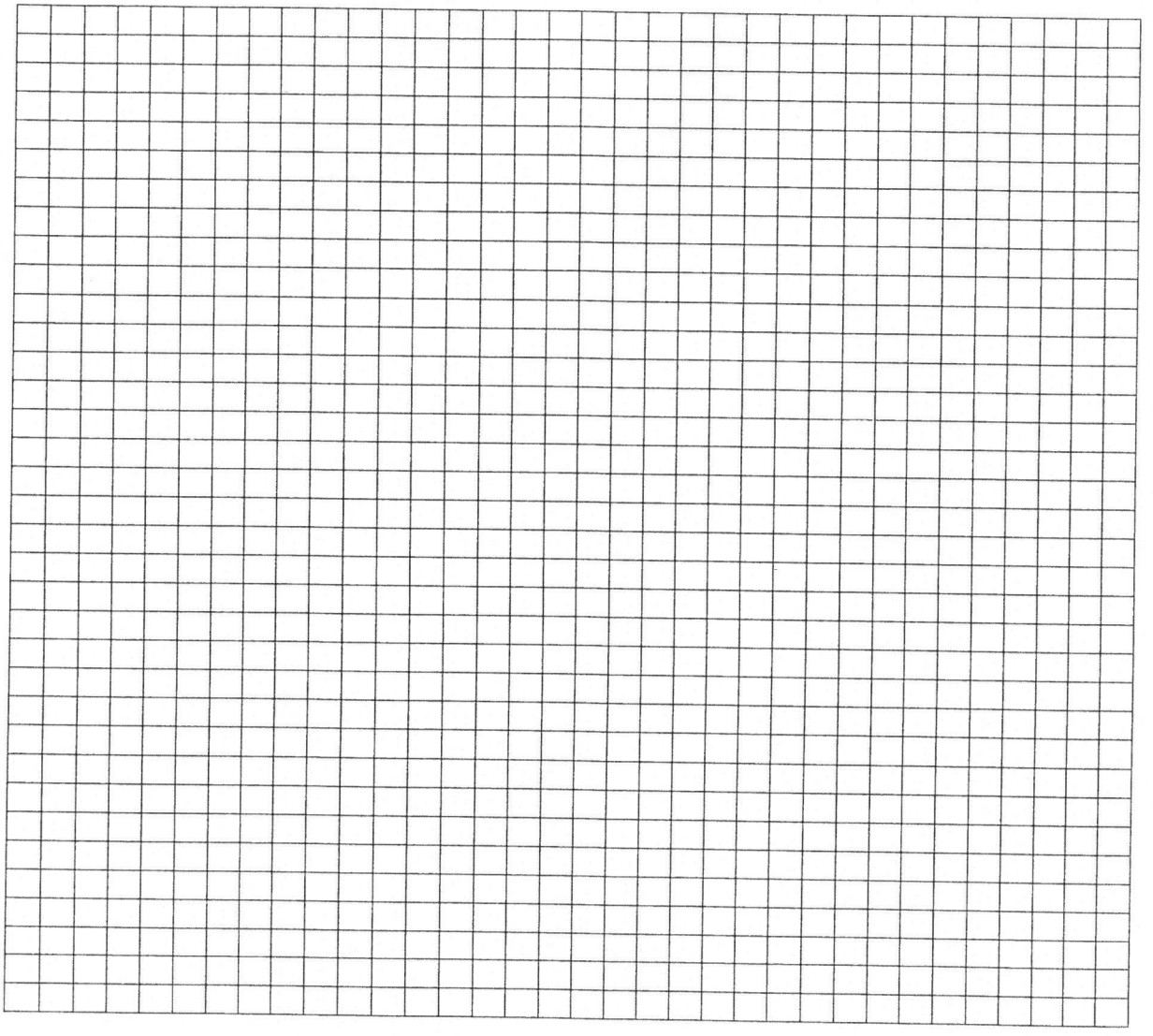
First Floor:



11. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



12. PRODUCT INVENTORY FORM

Make & Model of field instrument used: Mini Rae 3000

List specific products found in the residence that have the potential to affect indoor air quality. Use a separate sheet is necessary.

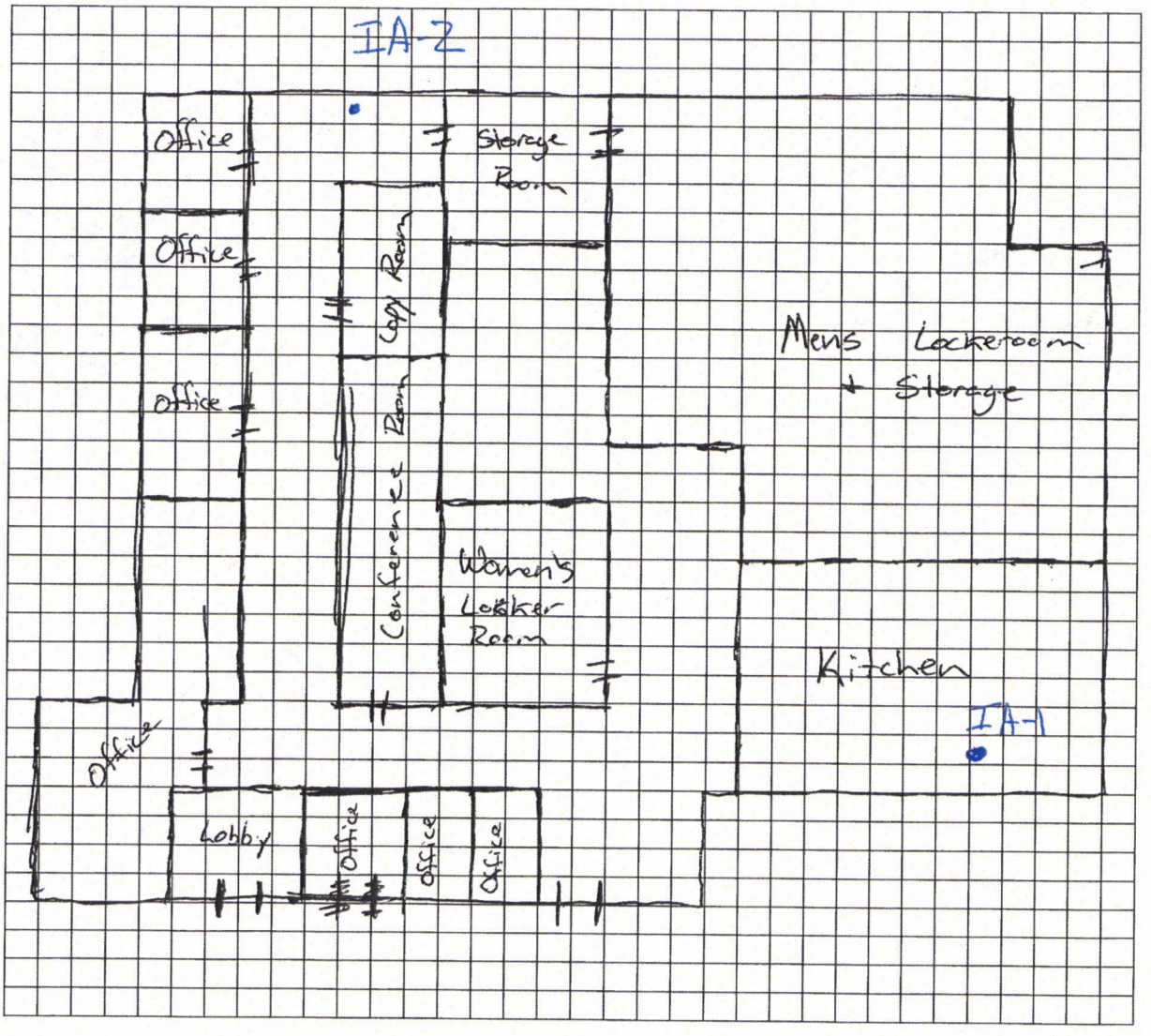
Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo Y / N
Mens Locker Room	Lysol	1.125 gal	U		0.2	Y
"	Degreaser	1 gal	U		0.2	Y
"	Sanitizer	1 gal	U	Octyl Ammonium Chloride	0.2	Y
"	Bleach	3.58L	U		0.2	Y
"	Stainless Steel Cleaner + Polish	15 oz (Aer)	U	Oil based	0.2	Y
"	Comet	1.31 lbs	U	Chlorinol	0.2	Y
"	Isopropyl Alcohol	1 pint	U		0.2	Y
	Paint	1 gal	U		0.2	Y
	Spray paint	12 oz	U		0.1	Y
Women's Locker Room	Lysol Disinfectant Spray	19 oz	U		0.0	Y
Kitchen	Raid Ant + Roach	17.5 oz	U	Imiprothrin, Cypermethrin	0.0	Y
"	Easy-off	160z	U		0.0	Y
"	CLR	28 floz	U		0.0	Y
"	Gum Solve	150z	U	Acetone, Toluene, Xylene	0.0	Y
Copy Room	Dust Remover	12 oz	U	1,1-difluoroethane	0.0	Y

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**

** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



Environmental Operations, Inc.

APPENDIX E

INDOOR AIR LABORATORY REPORTS

Environmental Operations, Inc.

APPENDIX B

SUB-SLAB FIELD NOTES

Environmental Operations, Inc.

Project No.: 2950R Project Name: Solutia Drawing: ___ of ___

Subject: Sub Slab Sampling By: Robert Andrews Scale: ___"= ___' Date: 9-24-16

		Depth	Water Dam	Time Start	Time Stop
Ahrens front	SSV-1	13 1/4"	Pass	9:09	9:26
Ahrens Break room	SSV-2	10.5"	Pass	9:33	9:43
School Vending	SSV-3	6 3/4"	~~pass~~	11:12 ~~10:54~~	11:13
School sink	SSV-4	6 3/4"	pass	10:57	11:07

	Vac Before	Vac After
SSV-1	-31"	-5.5"
SSV-2	-29"	-5"
SSV-3	-30"	N/A
SSV-4	-23"	-5"

SSV-3 did not pull a vacuum, the flow regulator was bent. Removed the regulator and hooked up the sample part to the regulator w/o the gauge. Was not able to determine how much vacuum was in the ~~sam~~ canister when we sampled.

4.5 hrs

January 30, 2017

Larry Fouts
Environmental Operations, Inc.
1530 South Second Street, Suite 200
St. Louis, MO 63104
TEL: (314) 241-0900
FAX: (314) 436-2900

RE: Solutia

WorkOrder: 17011313

Dear Larry Fouts:

TEKLAB, INC received 2 samples on 1/24/2017 4:55:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Marvin L. Darling II

Marvin L. Darling
Project Manager
(618)344-1004 ex 41
mdarling@teklabinc.com

Client: Environmental Operations, Inc.

Client Project: Solutia

Work Order: 17011313

Report Date: 30-Jan-17

This reporting package includes the following:

Client: Environmental Operations, Inc. **Work Order:** 17011313

Client Project: Solutia **Report Date:** 30-Jan-17

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- H - Holding times exceeded
- I - Associated internal standard was outside method criteria
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- T - TIC(Tentatively identified compound)
- X - Value exceeds Maximum Contaminant Level

Client: Environmental Operations, Inc.

Client Project: Solutia

Work Order: 17011313

Report Date: 30-Jan-17

Cooler Receipt Temp: NA °C

TO15 analysis was performed at the North Bluff Road facility in Collinsville Illinois, Agency Interest No. 166578.

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	Ryoungstrom@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2018	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2017	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2017	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2017	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2017	Collinsville
Arkansas	ADEQ	88-0966		3/14/2017	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Kentucky	KDEP	98006		12/31/2017	Collinsville
Kentucky	UST	0073		1/31/2017	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Missouri	MDNR	930		1/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2017	Collinsville

Client: Environmental Operations, Inc.
Work Order: 17011313

Client Project: Solutia
Report Date: 30-Jan-17

Lab ID: 17011313-001
Client Sample ID: IA-1

Matrix: AIR CANISTER
Collection Date: 01/24/2017 16:03

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
Chloroform	NELAP	0.1	0.50		**ND**	ppbv	1	01/26/2017 15:54
MW 119.38		0.0005	0.0024		**ND**	mg/m3		
Tetrachloroethene	NELAP	0.05	0.50		**2.54**	ppbv	1	01/26/2017 15:54
MW 165.83		0.0003	0.0034		**0.0172**	mg/m3		
Trichloroethene	NELAP	0.05	0.50		**0.69**	ppbv	1	01/26/2017 15:54
MW 131.39		0.0003	0.0027		**0.0037**	mg/m3		
Surr: 4-Bromofluorobenzene		0	41.2-165		**91.5**	%REC	1	01/26/2017 15:54
MW 175.00		0	41.2-165		**91.5**	%REC		

Client: Environmental Operations, Inc.

Work Order: 17011313

Client Project: Solutia

Report Date: 30-Jan-17

Lab ID: 17011313-002

Client Sample ID: IA-2

Matrix: AIR CANISTER

Collection Date: 01/24/2017 16:01

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
Chloroform	NELAP	0.1	0.50		**ND**	ppbv	1	01/26/2017 16:47
MW 119.38		0.0005	0.0024		**ND**	mg/m3		
Tetrachloroethene	NELAP	0.05	0.50		**3.35**	ppbv	1	01/26/2017 16:47
MW 165.83		0.0003	0.0034		**0.0227**	mg/m3		
Trichloroethene	NELAP	0.05	0.50		**0.92**	ppbv	1	01/26/2017 16:47
MW 131.39		0.0003	0.0027		**0.0049**	mg/m3		
Surr: 4-Bromofluorobenzene		0	41.2-165		**90.7**	%REC	1	01/26/2017 16:47
MW 175.00		0	41.2-165		**90.7**	%REC		

Client: Environmental Operations, Inc.
Work Order: 17011313
Client Project: Solutia
Report Date: 30-Jan-17

TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS

Batch 126512 **SampType:** MBLK Units **ppbv**
SampID: MBLK-U170126-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloroform	0.50		**ND**						01/26/2017
Tetrachloroethene	0.50		**ND**						01/26/2017
Trichloroethene	0.50		**ND**						01/26/2017
Surr: 4-Bromofluorobenzene			**8.53**	10.00		85.3	41.2	165	01/26/2017

Batch 126512 **SampType:** LCSD Units **ppbv** RPD Limit **30**
SampID: LCSD-U170126-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloroform	0.50		**11.7**	10.40	0	112.6	11.42	2.51	01/26/2017
Tetrachloroethene	0.50		**13.3**	10.50	0	126.7	12.90	3.05	01/26/2017
Trichloroethene	0.50		**12.8**	10.80	0	118.7	12.51	2.45	01/26/2017
Surr: 4-Bromofluorobenzene			**9.43**	10.00		94.3			01/26/2017

Batch 126512 **SampType:** LCS Units **ppbv**
SampID: LCS-U170126-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloroform	0.50		**11.4**	10.40	0	109.8	72.3	136	01/26/2017
Tetrachloroethene	0.50		**12.9**	10.50	0	122.9	60.3	148	01/26/2017
Trichloroethene	0.50		**12.5**	10.80	0	115.8	59.2	141	01/26/2017
Surr: 4-Bromofluorobenzene			**9.49**	10.00		94.9	41.2	165	01/26/2017

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Environmental Operations, Inc.

Client Project: Solutia

Work Order: 17011313

Report Date: 30-Jan-17

Carrier: Rob Andrews

Completed by: Laurie Langdon
On: 24-Jan-17

Received By: TAC

Reviewed by: Elizabeth A. Hurley
On: 25-Jan-17

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	NA
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.					
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑		
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑		
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑		
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑		

Any No responses must be detailed below or on the COC.

Samples were transferred to Collinsville Air Lab on 1/25/17 at 1:25PM. EAH 1/25/17

The pressure(s) of received canister(s) within acceptable parameters. Clients final pressure readings followed by readings taken upon arrival at the laboratory. HLR 1/25/17
IA-1 0/-3
IA-2 -3/0

TEKLAB, INC.
3920 Pintail Drive Suite A, Springfield, IL 62711 Phone (217) 698-1004 Fax (217) 698-1005
5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

pg 1 of 1 Lab Work Order # 17011313

AIR SAMPLING FIELD FORM AND CHAIN OF CUSTODY

Client Name: Environmental Operations Inc.
Address: 1530 S. 2nd Street
Phone: 314 241-0900
Email: LarryR@environmentalops.com
Project ID: Solutia
Project Manager: Larry Rosen
Sampler: Robert Andrews
PO Number: 2950 R

Results Requested (check one)
X Standard
___ 1-3 Day (100% surcharge)
___ 4-5 Day (50% surcharge)
___ Other (specify below)

Sample Type (check one)
___ Ambient Air
X Indoor Air
___ Indoor Sub-Slab
___ Stack
___ Soil Gas/Vapor
___ Landfill Gas
___ Other (specify)

Lab Use Only: Sample pick up: Y ✓ N. Samples on: ___ Ice/Blue ✓ No Ice, NR Temp. °C
Comments:

Lab Use Only				Sample Start Parameters			Sample Stop Parameters			Requested Analysis (list metals/other below in comments)						
Laboratory ID	Sample Identification	Canister Number	Controller Number	Date	Time	Vacuum (in. Hg)	Date	Time	Vacuum (in. Hg)	TO-15 Lists (circle) Standard Extended	TO-15 select BTEX MBTE Naphthalene Isopropanol TPH-GRO	TO-13	TO-4	PM10/ TSP	Metals	Other
17011313-001	IA-1	23113	3306	1-24-17	8:12	-28"	1-24-17	16:03	0"		X					
002	IA-2	23131	3266	1-24-17	8:13	-30"	1-24-17	16:01	-3"		X					

Are these samples known to be involved in litigation? If yes, a level IV data package will be generated and a surcharge will apply. ___ Yes X No
Are these samples known to be hazardous? ___ Yes X No
Special QC Requirements/Special Instructions/Comments: Please analyze for chloroform, TCE, PCE.

Shipping Company and Tracking Number:

Relinquished By	Date/Time	Received By	Date/Time
Tracy Carroll	1-24-17 / 16:55	Tracy Carroll	1/24/17 1655
Tracy Carroll	1/25/17 13:25	Heather Riley	1/25/17 13:25

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse, and has the authority to sign on behalf of client.

White Copy - Laboratory Yellow Copy- Sampler

TAC 1/24/17

July 31, 2017

Larry Rosen
Environmental Operations, Inc.
1530 South Second Street, Suite 200
St. Louis, MO 63104
TEL: (314) 480-4694
FAX: (314) 436-2900

RE: Solutia 2950R

WorkOrder: 17071136

Dear Larry Rosen:

TEKLAB, INC received 2 samples on 7/20/2017 9:20:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Client: Environmental Operations, Inc.
Work Order: 17071136
Client Project: Solutia 2950R
Report Date: 31-Jul-17

This reporting package includes the following:

Client: Environmental Operations, Inc.

Work Order: 17071136

Client Project: Solutia 2950R

Report Date: 31-Jul-17

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- H - Holding times exceeded
- I - Associated internal standard was outside method criteria
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- T - TIC(Tentatively identified compound)
- X - Value exceeds Maximum Contaminant Level

Client: Environmental Operations, Inc.

Work Order: 17071136

Client Project: Solutia 2950R

Report Date: 31-Jul-17

Cooler Receipt Temp: NA °C

TO15 analysis was performed at the North Bluff Road facility in Collinsville Illinois, Agency Interest No. 166578.

Locations

Collinsville

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	jhriley@teklabinc.com

Collinsville Air

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	EHurley@teklabinc.com

Springfield

Address	3920 Pintail Dr Springfield, IL 62711-9415
Phone	(217) 698-1004
Fax	(217) 698-1005
Email	KKlostermann@teklabinc.com

Chicago

Address	1319 Butterfield Rd. Downers Grove, IL 60515
Phone	(630) 324-6855
Fax	
Email	jhriley@teklabinc.com

Kansas City

Address	8421 Nieman Road Lenexa, KS 66214
Phone	(913) 541-1998
Fax	(913) 541-1998
Email	jhriley@teklabinc.com

Client: Environmental Operations, Inc.

Work Order: 17071136

Client Project: Solutia 2950R

Report Date: 31-Jul-17

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2018	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2018	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2018	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2018	Collinsville
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2018	Collinsville
Arkansas	ADEQ	88-0966		3/14/2018	Collinsville
Illinois	IDPH	17584		5/31/2017	Collinsville
Indiana	ISDH	C-IL-06		1/31/2018	Collinsville
Kentucky	KDEP	98006		12/31/2017	Collinsville
Kentucky	UST	0073		1/31/2018	Collinsville
Louisiana	LDPH	LA170027		12/31/2017	Collinsville
Missouri	MDNR	930		1/31/2018	Collinsville
Missouri	MDNR	00930		5/31/2017	Collinsville
Oklahoma	ODEQ	9978		8/31/2017	Collinsville

Client: Environmental Operations, Inc.
Work Order: 17071136

Client Project: Solutia 2950R
Report Date: 31-Jul-17

Lab ID: 17071136-001
Client Sample ID: IA-1

Matrix: AIR CANISTER
Collection Date: 07/19/2017 15:10

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
Chloroform	NELAP	0.1	0.50		**ND**	ppbv	1	07/31/2017 11:30
MW 119.38		0.0005	0.0024		**ND**	mg/m3		
Tetrachloroethene	NELAP	0.05	0.50		**0.87**	ppbv	1	07/31/2017 11:30
MW 165.83		0.0003	0.0034		**0.0059**	mg/m3		
Trichloroethene	NELAP	0.05	0.50		**ND**	ppbv	1	07/31/2017 11:30
MW 131.39		0.0003	0.0027		**ND**	mg/m3		
Surr: 4-Bromofluorobenzene		0	46.9-145		**101.9**	%REC	1	07/31/2017 11:30
MW 175.00		0	46.9-145		**101.9**	%REC		

Client: Environmental Operations, Inc.

Work Order: 17071136

Client Project: Solutia 2950R

Report Date: 31-Jul-17

Lab ID: 17071136-002

Client Sample ID: IA-2

Matrix: AIR CANISTER

Collection Date: 07/19/2017 15:15

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed
TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS								
Chloroform	NELAP	0.1	0.50		**ND**	ppbv	1	07/31/2017 12:22
MW 119.38		0.0005	0.0024		**ND**	mg/m3		
Tetrachloroethene	NELAP	0.05	0.50		**0.83**	ppbv	1	07/31/2017 12:22
MW 165.83		0.0003	0.0034		**0.0056**	mg/m3		
Trichloroethene	NELAP	0.05	0.50		**ND**	ppbv	1	07/31/2017 12:22
MW 131.39		0.0003	0.0027		**ND**	mg/m3		
Surr: 4-Bromofluorobenzene		0	46.9-145		**101.0**	%REC	1	07/31/2017 12:22
MW 175.00		0	46.9-145		**101.0**	%REC		

Client: Environmental Operations, Inc. **Work Order:** 17071136

Client Project: Solutia 2950R **Report Date:** 31-Jul-17

TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS

Batch 132673 **SampType:** MBLK Units **ppbv**
SampID: MBLK-U170729 -1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloroform	0.50		**ND**						07/29/2017
Tetrachloroethene	0.50		**ND**						07/29/2017
Trichloroethene	0.50		**ND**						07/29/2017
Surr: 4-Bromofluorobenzene			**10.4**	10.00		104.5	46.9	145	07/29/2017

Batch 132673 **SampType:** MBLK Units **%REC**
SampID: MBLK-U170729-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Surr: 4-Bromofluorobenzene			**10.1**	10.00		101.2	46.9	145	07/29/2017

Batch 132673 **SampType:** LCSD Units **ppbv** RPD Limit **30**
SampID: LCSD-U170729-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloroform	0.50		**9.10**	10.70	0	85.0	9.520	4.51	07/29/2017
Tetrachloroethene	0.50		**9.61**	10.70	0	89.8	10.14	5.37	07/29/2017
Trichloroethene	0.50		**9.45**	10.70	0	88.3	9.960	5.26	07/29/2017
Surr: 4-Bromofluorobenzene			**10.1**	10.00		101.1			07/29/2017
Surr: 4-Bromofluorobenzene			**9.80**	10.00		98.0			07/29/2017

Batch 132673 **SampType:** LCS Units **ppbv**
SampID: LCS-U170729-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloroform	0.50		**9.52**	10.70	0	89.0	52.9	143	07/29/2017
Tetrachloroethene	0.50		**10.1**	10.70	0	94.8	63.3	160	07/29/2017
Trichloroethene	0.50		**9.96**	10.70	0	93.1	59.1	148	07/29/2017
Surr: 4-Bromofluorobenzene			**9.82**	10.00		98.2	46.9	145	07/29/2017
Surr: 4-Bromofluorobenzene			**10.1**	10.00		101.4	46.9	145	07/29/2017

Batch 132698 **SampType:** MBLK Units **ppbv**
SampID: MBLK-U170731-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloroform	0.50		**ND**						07/31/2017
Tetrachloroethene	0.50		**ND**						07/31/2017
Trichloroethene	0.50		**ND**						07/31/2017
Surr: 4-Bromofluorobenzene			**9.44**	10.00		94.4	46.9	145	07/31/2017

Batch 132698 **SampType:** LCSD Units **ppbv** RPD Limit **30**
SampID: LCSD-U170731-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloroform	0.50		**10.3**	10.70	0	96.4	10.38	0.68	07/31/2017
Tetrachloroethene	0.50		**9.28**	10.70	0	86.7	9.320	0.43	07/31/2017
Trichloroethene	0.50		**9.87**	10.70	0	92.2	9.880	0.10	07/31/2017
Surr: 4-Bromofluorobenzene			**9.96**	10.00		99.6			07/31/2017

Client: Environmental Operations, Inc.

Work Order: 17071136

Client Project: Solutia 2950R

Report Date: 31-Jul-17

TO-15, VOLATILE ORGANIC COMPOUNDS, BY GC/MS

Batch 132698 **SampType:** LCS Units **ppbv**

SampID: LCS-U170731-1

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloroform	0.50		**10.4**	10.70	0	97.0	52.9	143	07/31/2017
Tetrachloroethene	0.50		**9.32**	10.70	0	87.1	63.3	160	07/31/2017
Trichloroethene	0.50		**9.88**	10.70	0	92.3	59.1	148	07/31/2017
Surr: 4-Bromofluorobenzene			**9.95**	10.00		99.5	46.9	145	07/31/2017

Teklab, Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Environmental Operations, Inc.
Work Order: 17071136
Client Project: Solutia 2950R
Report Date: 31-Jul-17

Carrier: Austin Luecke
Received By: KF

Completed by: Kalyn Foecke
On: 20-Jul-17
Kalyn Foecke

Reviewed by: Elizabeth A. Hurley
On: 20-Jul-17
Elizabeth A. Hurley

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	NA
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.					
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑		
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑		
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☑		
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑		

Any No responses must be detailed below or on the COC.

Samples were transferred to Collinsville Air Lab on 7/21/17 at 08:35. EAH 7/21/17

Clients sample id, canister id and clients final pressure readings followed by readings taken upon arrival at the laboratory.
IA-1 1028 -8/-7
IA-2 957 -20/-22

TEKLAB, INC.
3920 Pintail Drive Suite A, Springfield, IL 62711 Phone (217) 698-1004 Fax (217) 698-1005
5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

pg 1 of 1 Lab Work Order # 17071136

AIR SAMPLING FIELD FORM AND CHAIN OF CUSTODY

Client Name: EOI
Address: 1530 S 2nd St
Phone: 314-241-0900
Email: Larry R @ environmentalops.com
Project ID: Solutia
Project Manager: Larry Rosen
Sampler: Austin Luecke
PO Number: 2950R

Results Requested (check one)
X Standard
___ 1-3 Day (100% surcharge)
___ 4-5 Day (50% surcharge)
___ Other (specify below)

Sample Type (check one)
___ Ambient Air
X Indoor Air
___ Indoor Sub-Slab
___ Stack
___ Soil Gas/Vapor
___ Landfill Gas
___ Other (specify)

Lab Use Only: Sample pick up: ___Y X N, Samples on: ___Ice/Blue X No Ice, N/A Temp. °C
Comments:

Lab Use Only				Sample Start Parameters			Sample Stop Parameters			Requested Analysis (list metals/other below in comments)						
Laboratory ID	Sample Identification	Canister Number	Controller Number	Date	Time	Vacuum (in. Hg)	Date	Time	Vacuum (in. Hg)	TO-15 Lists (circle) Standard Extended	TO-15 select BTEX MBTE Naphthalene Isopropanol TPH-GRO	TO-13	TO-4	PM10/ TSP	Metals	Other
1707113600 1	IA-1	1028	3305	7-19-17	710	30	7-19-17	3:10	8		X					
002	IA-2	957	3329	7-19-17	715	30	7-19-17	3:15	20		X					

Are these samples known to be involved in litigation? If yes, a level IV data package will be generated and a surcharge will apply. ___Yes X No
Are these samples known to be hazardous? ___Yes X No
Special QC Requirements/Special Instructions/Comments: Please analyze for chloroform, TCE, PCE

Shipping Company and Tracking Number:

Relinquished By	Date/Time	Received By	Date/Time
Austin Luecke	7-20-17 920	[signature]	7/20/17 920
[signature]	7-21-17 8:35	[signature]	7/21/17 8:35

The individual signing this agreement on behalf of client acknowledges that he/she has read and understands the terms and conditions of this agreement, on the reverse, and has the authority to sign on behalf of client.

White Copy - Laboratory Yellow Copy- Sampler

KF 7/21/17